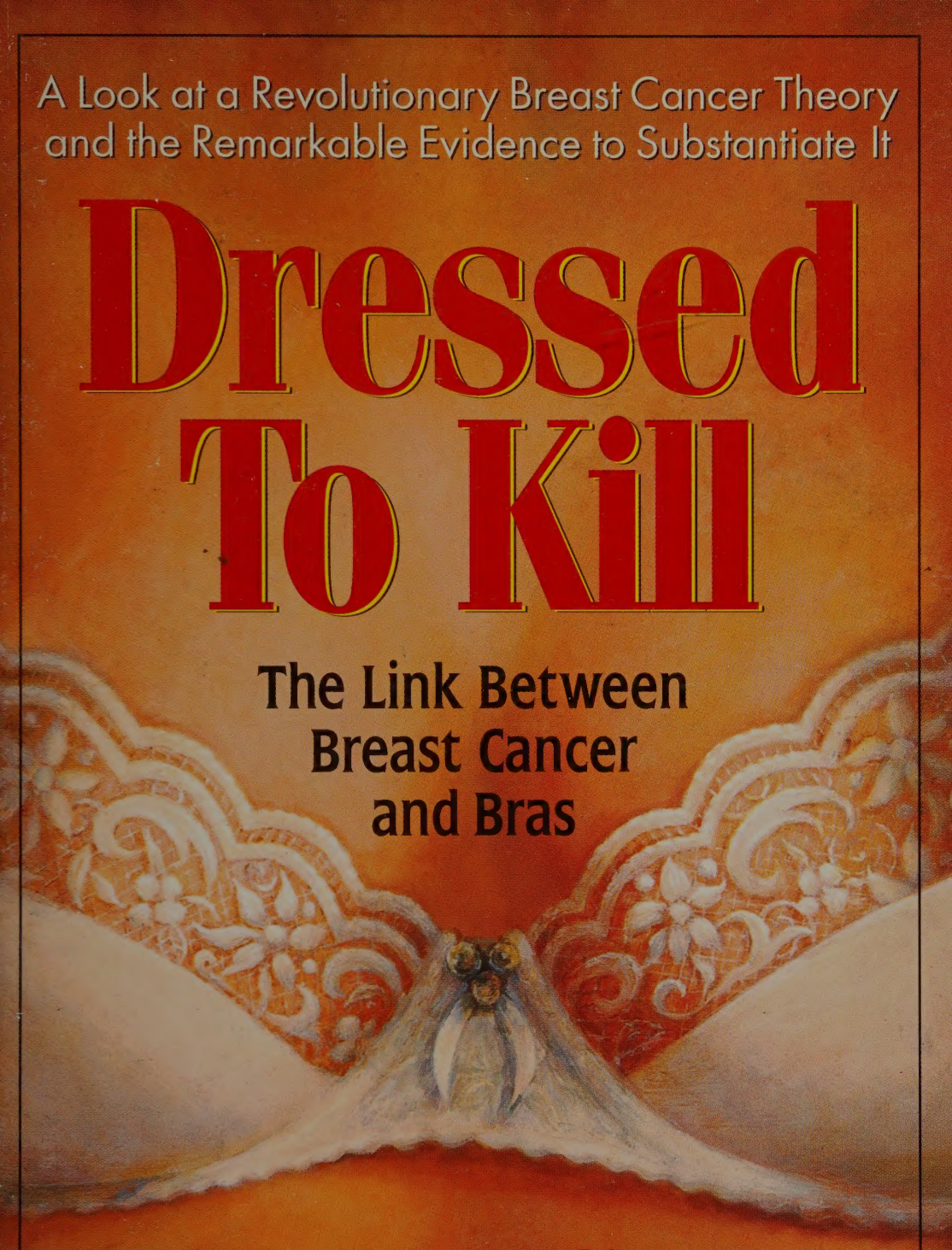
A Look at a Revolutionary Breast Cancer Theory and the Remarkable Evidence to Substantiate It

Dressed To Kill

The Link Between Breast Cancer and Bras



Sydney Ross Singer
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This work is dedicated to women and their families throughout the world who have suffered through the tragedy of breast cancer. May future generations be spared their plight.

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Preface

Cancer is, perhaps, the most feared of human diseases. For a woman, the most feared cancer is cancer of the breast.

The root cause of fear is a feeling of helplessness and lack of knowledge. If the cause of breast cancer were understood, a woman would know how to prevent the disease. There would be something she could do to keep herself healthy. It is through knowledge of the cause of a disease that we lose our fears. It is in the darkness of ignorance that fears haunt us.

Despite the heavy toll taken by breast cancer, little has been done to stem this growing menace. Meanwhile, virtually every American woman is becoming familiar with this plague of our time. Perhaps a friend or relative has the disease, went through treatment for it, or died from it. Perhaps the woman herself experienced the horror of finding a breast lump. Current estimates are that 90 percent of all women in America will experience at least a breast cancer scare by finding a breast lump at some time. Thankfully, most of these lumps will not be cancerous. Is there anything women can do to be spared from this poorly understood menace?

To answer this question, we must first understand the cause of breast cancer, which is, as yet, elusive. Why has the cause been so elusive? Have researchers been search-

ing for clues in the right places? Might a new direction and new research approach prove fruitful in uncovering some aspects of this disease that have been previously ignored, overlooked, or misunderstood?

Several risk factors have been identified in association with breast cancer, but their connection to the disease is not clear. Mechanisms through which cells become cancerous have been discovered, including the role of hormones, DNA, and other cellular molecules and structures. Radiation, certain chemicals, and some genetic factors have been identified with the development of cancer. And certain lifestyle practices have been associated with breast cancer. But no approach has come up with a deep enough answer regarding the cause of breast cancer.

The difference between risk factors for breast cancer and a cause of breast cancer is that risk factors do not explain why women get the disease, only that certain factors are associated with women who do develop the disease. Causal explanations have more asked of them. They must make sense, not just show some statistical association. Causal explanations must tell how something happens. They must provide a mechanism.

The current mystery about breast cancer and other cancers is due to the limitations of the research methods used. Every branch of science has its own point of view about the world and about the correct method for conducting research. We have employed a new research approach for understanding breast cancer: *applied medical anthropology.*

Let me explain each component. Fundamentally, applied medical anthropology is a form of anthropology, which is the study of mankind. It is probably the broadest of all fields, since all activities of mankind are within its scope. This includes aspects of life that we all take for granted, such as our customs of dress and eating. It also includes economic systems; political structures; ideolo-

gies; thought processes; religions; sex roles; forms of interpersonal relationships; forms of self-expression such as language, art, music, and dance; and every other facet of the activities that make us human beings. Of relevance to diseases such as breast cancer is anthropology's study of lifestyles—and lifestyles, as you will see, are responsible for most of our illnesses and deaths.

To understand how lifestyles affect human health, one needs a good understanding of how the human body works. Medical anthropology is the branch of anthropology that studies the medical and health issues of different cultures. When it comes to breast cancer, for example, medical anthropologists may study how different cultures treat the disease. The focus would be on a cultural comparison concerning breast cancer diagnosis, treatment, and perhaps the outcome of that treatment.

What we are practicing, however, is more than medical anthropology, which, like anthropology in general, is a basic science. What we are doing is an *applied* science. The difference is that basic science is a general search for information. It is a curiosity about the world and a desire to gain information, without any concern for its practicality. In other words, basic scientists do research that has no currently known application. Applied science, on the other hand, is focused on a particular problem.

As applied medical anthropologists, then, we do more than study the cultural aspects of a disease. We study diseases and how they are caused by cultural factors. Put differently, we try to find the biological consequences of certain cultural practices. We refer to the diseases caused by culture as *culturogenic diseases.* Heart disease, for example, is predominantly a culturogenic disease because it is produced by certain lifestyles, particularly those bearing high stress, a poor diet, and minimal exercise.

How have we developed this concept of applied medi-

cal anthropology? As my graduate training and experience in anthropology, biochemistry, and medicine took me through these various specialities, I had the opportunity to experience their strengths and weaknesses.

Biochemistry has the research strength of precision and highly analytic method, although it suffers from considering all life processes, even human behavior, as biochemical processes. Humanity gets lost in the shuffle of beakers and test tubes.

Cultural anthropology has the advantage of studying humanity from a broad viewpoint and seeing the world from many perspectives, but it lacks the rigorousness of the "harder" sciences. As a basic science, it also lacks practical application for its research.

Medicine has the strength of understanding the body from a very technical physical and chemical perspective, but it has the weakness of seeing people as mere machines that function according to certain chemical reactions. The flaws found in biochemistry also plague medicine, since much of medicine is defined by biochemists. Nowhere in modern medicine, as far as I can determine, is there a serious appreciation of human beings as cultural entities.

While each of these fields has its limitations, much can be gained by combining their strengths. That is what we have done with applied medical anthropology.

I am not alone in this approach to research. Soma Grismaijer is my co-author, co-researcher, and spouse—and the inspiration for this breast cancer research. Through her training and experience in behavioral science, ecology, environmental health, and anthropology, Soma has brought an environmental perspective to our approach. You cannot truly understand people and their lifestyles without understanding the natural and man-made worlds in which those lifestyles are practiced.

Soma has also provided this breast cancer project with

something a man could not have achieved on his own: a woman's point of view. Breast cancer is primarily a woman's disease. The entire success of this project rested with Soma's ability to objectively question women about their lifestyles and their disease.

With our applied medical anthropology approach, Soma and I have put the pieces of the breast cancer puzzle together in a new way, constructing a picture so obvious that we wonder why others have not already seen it. We have developed a new theory about breast cancer and have tested that theory by conducting original research on thousands of women. And we feel confident that we have discovered something tremendously important.

We believe that we have found a trigger for breast cancer. It is a trigger that is pulled by women themselves—but the gun is loaded by society.

The cause of breast cancer is complex, as you shall see. It involves biological, environmental, and cultural factors. Some of these are difficult to change. Others are easy to address.

We understand that, on first blush, the wearing of bras being linked to cancer is an easy target for humor. We understand that laughter can be an excellent defense mechanism. All we ask is that the facts in this book be judged fairly. Nothing more, nothing less.

We hope this book provides the right amount of light in the darkness that surrounds breast cancer. By actually seeing what goes on, we can better understand the root cause of the disease. And by understanding how it begins, we can now be in a position to prevent it.

Introduction

Bras can cause breast cancer!? You're joking, right?" That, of course, would be the usual response. As apparel designed to enhance a woman's bustline, bras seem the least likely candidate for a cause of breast cancer that you could imagine. They make you think about Madonna, not about mastectomy. They create cleavage, not cancer. Right?

But as you shall learn, bras are more than objects of fashion. They transform more than appearance.

For women, breasts rate as one of the most important features of their bodies. This bias is no doubt emphasized by our society's preoccupation with breasts. Styles of women's clothing, from underwear to nightgowns to bathing suits to business suits, focus on breasts and the bustline. Breasts are truly an American obsession.

Ironically, this obsession with breasts may be a root cause of cancer.

Breaking New Ground

The search for a breast cancer cause is a frantic one. Thousands of people spend their entire professional lives working on this one problem, and typically on one small aspect of the problem. Thousands of pages of research results are

generated annually concerning breast cancer. Yet little information has provided any hope for the prevention or cure of this dread disease. Are all these great scientific minds barking up the wrong tree?

Breast cancer incidence is higher now than ever before in history. This disease is now spreading worldwide, with no end in sight. And despite the discovery of certain risk factors for the disease, the research community admits it is just as much in the dark regarding the cause as it was fifty years ago. Many researchers, such as breast cancer epidemiologists Dr. Jennifer Kelsey and Dr. Marilie Gammon of the Columbia University School of Public Health, are calling for a new approach to the problem, a fresh perspective.

But bras? How can they be the cause of breast cancer?

Few things are what they seem on the surface. By the time you finish this book, we hope to have changed the way you look at bra wearing and other lifestyle choices.

This book is based on hard evidence, evidence that comes from medical research performed by others in the breast cancer field. It also comes from what we termed the Bra and Breast Cancer (BBC) Study, which we conducted to discover the attitudes, values, and behaviors of American women regarding their breasts and bras. As you will see, the way in which women feel and act toward their breasts and bras has a great deal to do with their development of breast cancer.

Of course, at the beginning of any good study there must be a theory. We arrived at our theory—that breast cancer may be triggered by the wearing of bras—by connecting previously disconnected facts. The field of cancer research is so overloaded with details and information that connecting the pieces seems impossible. But, as will be evident, when all the pieces are put together, the answer is so obvious that one feels it should have been thought of long ago.

When we tested this theory, the findings were astound-

ing. The connection of bras to breast cancer proved greater than our original expectations. And the implications of our research go far beyond breast cancer.

Perhaps the greatest challenge that faces any researcher is the need to keep an open mind. We cannot hope to unravel the mysteries of our time when faced with the biases of our time. Indeed, mysteries exist because we have been taught ways of seeing the world that are necessarily limited by our cultural perspective. It is our own ignorance and lack of vision that create mysteries—and epidemics like breast cancer.

To put this in perspective, let's use an example from medical history. During the eighteenth and part of the nineteenth centuries, women and their newborn children were dying from childbed fever throughout parts of Europe. This epidemic, which claimed the lives of up to 50 percent of the women who delivered their babies in certain hospitals, was a mystery to the great medical minds of the time. In attempts to explain the cause of these deaths, theories multiplied for over a century, many reflecting deep, complex thought and elaborate medical reasoning. However, the solution, as history has shown, was simple, not complex: Physicians were not washing their hands between patients or after handling dead, diseased bodies. As unwitting transmitters, doctors spread disease throughout the maternity wards of the newest hospitals of the time.

Like other people of that era, physicians were ignorant about the connection between cleanliness and health—evidence that even the experts of the day are limited by the biases of their culture. Simple solutions often underlie seemingly complex problems and are usually related to the implicit habits and customs of the time. The challenge of any era in addressing an illness that plagues society is to examine the problem from an impartial, objective perspective. But impartiality is as elusive as truth itself.

We are all subjects—and victims—of our time and our perspective in history. Truth, or our perception of it, is a function of our limited, culture-bound understanding and is often as fluid as a change in custom. The problems this poses for medical research are ongoing, but, as you shall see, they are occasionally surmountable. The best we can hope to do is rise above our culture as much as possible to see our biases, challenge them, and willingly allow our view of the world to shatter as our biases knuckle under the blows of scrutiny.

What is it about the lifestyle, or culture, of certain nations today that makes breast cancer a major disease for its women? As we attempt to answer this question, we will be challenging the reader to look at the assumptions and basic behaviors that mold and define everyday life for most Americans and other first-world citizens. As the pillars of culture are shaken, there may be a tendency to reject the question as irrelevant or as too simple. That is to be expected. Denial best characterizes this response to a challenge of values and behaviors. Who wants to see the very fabric of their culture stretched to such a limit of examination?

Yet we must all get past this denial if there is to be any meaningful advance made in the understanding of culture-caused, or culturogenic, disease. Like a skilled surgeon, we must dissect those aspects of culture that work against our health and that can shed light on this mystery of breast cancer.

You will learn that the cultural assumption we must question pertains to fashion—specifically, to the idea that wearing bras has no effect on health. Bras are so accepted by modern Western societies that questioning their impact on the health of breast tissue sounds ludicrous. But, as will be evident, this question makes good sense medically and is borne out by the results of a study we conducted on women in the United States.

Our purpose in writing this book is to make this information accessible to everyone interested in the topic. We have avoided medical jargon as best we could so that the reader need not have a medical education to understand the information. All that is needed is an open mind—and a willingness to examine the evidence.

1

Looking for the Enemy

On March 5, 1991, my wife, Soma, and I entered the field of breast cancer research. That was the day Soma discovered a lump in her breast. Even worse, Soma was two months pregnant.

At the time, we were engaged in fieldwork on one of the Fiji Islands, studying the effect of the introduction of Western medicine, including the use of pharmaceutical drugs, on the health and lifestyles of these people. We had chosen Fiji largely because villages on different islands had varying degrees of exposure to Western medicine and drugs, allowing for a comparison. Also, most Fijians speak English, making interviews of villagers much easier.

This type of research had been a dream of mine since I began college. I had always understood that the way people live affects their health. According to the World Health Organization, 70 to 80 percent of people in developed nations—such as the United States—die from lifestyle-caused diseases. Healthful living habits, a clean environment, nourishing food, a positive attitude, and a good constitution all seemed essential for good health. It was my goal to examine disease as it relates to all of these factors.

This approach to understanding disease essentially asks the what, where, and who of what it means to be human. *What are people?* addresses the biological issues tackled by biomedical research and medicine. *Where are people?* considers the importance of studying the environment, which defines the external conditions people live in, including the quality of their food, air, and water. *Who are people?* defines behaviors, attitudes, and values—in short, lifestyles. The way people live will largely determine whether they get their biological needs met in their given environment. Hopefully, we could discover the cause of a disease by examining the environment, human biology, and culture. After all, you really cannot understand people or their diseases without understanding where people live, how they are built and function biologically, and how they live. Viewing people and their diseases in anything less than this full picture would be seeing only part of what it means to be human, and would provide only a partial solution to the problem of disease.

THE PROBLEM OF SPECIALIZATION

Unfortunately, we live at a time when specialization has fragmented our understanding of ourselves and the world in which we live. Both the educational system in the United States and most professions promote specialization. In college, you have to pick a "major" field of study. In graduate school, you are expected to learn how to become an expert in your specialized field. And in practice, professionals must protect their turf from other alleged experts. All this translates into a system in which virtually everyone is a specialist. Hard lines are drawn between professions. You are either an anthropologist or a medical doctor or a biochemist or a philosopher. It is considered unpro-

fessional to step out of one's field of expertise and journey into areas within another profession's scope.

The benefit of specialization, of course, is that specialists focus on a small area, and thus become extremely familiar with their field of study. You would expect a specialist to be a master of every known facet of his field, from obscure facts to hands-on experience. People suffering from a specific health problem rely on this when they go to a physician specialist, as when cancer patients seek the help of an oncologist.

However, in medicine, as in other professions, the benefits of becoming highly focused and specialized are diminished by the inability to see the broader picture. As a specialist becomes an expert on his own particular tree, so to speak, his view of the forest can be lost. Cancer is one of those forests.

Many specialists apply themselves to the field of cancer. Biochemists study the molecular processes that are involved in the transformation of a normal cell into a cancerous one. Geneticists examine the DNA code that may lead cancer cells to divide without limit. Oncologists specialize in the treatment of cancers using drugs, radiation, and surgery. There are specialists for each type of cancer, and as the cancer field grows, each specialist gets progressively adapted to his own research or treatment niche, and his focus gets narrower and narrower.

It has always seemed to me that the larger the perspective, the greater will be the truth that is discovered. If your goal is to understand how the forest works, then studying one tree in immense detail, including its microscopic structure, genetic makeup, and so forth, will obviously tell you something—but clearly not enough to understand the forest. You must also study the trees in relation to one another, to other plant and animal life, and to the sun, wind, rain, and soil, to name a few factors. Studying the details

of each of these factors in isolation from the other factors will not give you the complete picture of the forest. The whole is greater than the sum of the parts. As we study each part, we must not remove it from the context of the whole. It is only by studying a complete system as a whole that we can understand how it operates, and see its parts in the proper perspective. But there has been a progressive loss of the big picture through specialization—and our educational system reflects this, since the professors are themselves specialists in their respective fields.

Yet it was the big picture that interested me most, which is why I was attracted to medical anthropology—one of the few specialities that provides a broad view of the human condition by bringing together various scientific disciplines. As a medical anthropologist, I rely on the fields of biochemistry, medicine, and anthropology to study human disease. Anthropology is the study of people and cultures, addressing the complex web of social systems, beliefs, practices, ideologies, and behaviors that define who people are. It considers economic realities, political structures within society, power relationships between different groups within society and between the sexes, customs, values, attitudes, and everything else that makes us human.

Prior to my entering the field of anthropology, I had been a biochemist. Biochemistry examines the miniature world inside cells. To the biochemist, the cell is an amazing machine, manufacturing and processing fats, carbohydrates, proteins, nucleic acids, enzymes, and other biomolecules. The application of biochemistry to human health has led to a deep appreciation of the complexities of cellular processes. Understanding people from this subcellular perspective is like looking at people from the inside out. Anthropology, on the other hand, looks at people from the outside in. Can these two fields be combined into one scientific pursuit?

A BRIDGE LINKING SPECIALTIES

Medicine is a bridge between biochemistry and anthropology and forms a pillar of the field of medical anthropology. Modern medicine is rooted in biochemistry and studies the larger systems that employ biochemical reactions, but it examines the body as a whole and deals with whole people. I attended medical school to expand my understanding of the human body. People are more than a product of their internal chemical reactions.

The field of medical anthropology is relatively young. The term itself first came into use in the 1950s, although medical anthropology has been practiced for over 100 years. Medical anthropologists examine cultural factors that influence access to health care, the relationship between the health care provider and patient as a cultural phenomenon, and the ways in which different cultures deal with certain health crises. Margaret Mead, the renowned anthropologist, performed the now-famous medical anthropology study called *The Coming of Age in Samoa,* which examined how young women in Samoa experienced their menstrual periods. Mead wanted to know whether the uncomfortable emotional and physical signs that accompany this life event for American women were also experienced by Samoan women.

One of my first projects as a medical anthropologist was an exploration of the relationship between physicians and patients with regard to prescription drugs. From my medical school and biochemistry training, I was well aware of the power of drugs and their ability to create unwanted side effects. As a medical anthropologist, I was concerned about the power structure of the physician-patient relationship and the effect it has on the quality of information shared by both parties.

This is when I began to work with Soma professionally. Her training and experience in environmental studies and

planning made clear to her the effect of chemical toxins on human health. Of special interest to Soma, who also has a background in anthropology and behavioral science, are the cultural factors that lead people to accept toxic conditions in their home and work environments. A licensed optician, Soma participated in patient care and observed over the years that people taking certain medications had poorer eyesight than would be predicted by their health condition alone. Could this poor eyesight be due to the medication itself, she wondered, since visual disturbances are frequently reported as a side effect of certain drugs? Discussing this possibility with patients, she discovered that few, if any, were told by the prescribing physician or pharmacist of this possible drug reaction. Naturally, when I told her of my planned study on drug side effects and doctor-patient communication, she was quite interested in participating.

In the course of interviewing patients and doctors, we discovered that patients were indeed not getting necessary information from doctors about drug side effects, leading to a health crisis we termed *Prescription Side Effect Syndrome.* We brought this problem to public attention through seminars and radio shows across the country, as well as through a toll-free medication side effects hotline.

As anthropologists we were, of course, interested in seeing whether this pharmaceutical problem existed in other cultures as well, and to what extent. This is what prompted us to visit Fiji as one of our first cross-cultural research projects.

But it is hard to work on someone else's problems when you suddenly have your own. Soma's breast lump was a bombshell in our lives. We turned all our attention to Soma and committed ourselves to approaching the problem reasonably.

When you discover a lump, your first reaction is fear and panic. Is it cancer? Could it be benign, and might it

simply go away? What could have been done to prevent this? What did we do wrong? Why us?

I am speaking in the plural because breast cancer strikes a woman's family and all her loved ones as well as herself. Compounding the problem was the fact that Soma was forty-one and pregnant. This may have been our only chance to have a child together, and it was to be my first child. How would the baby be affected by this?

Soma and I discussed how we would handle the problem. We agreed to demand certain things of her health care and to consider all options accordingly. A key demand was that the risks of health care not exceed the benefits. With this in mind, I opened my medical books and read everything I could find about breast cancer. I searched medical libraries for important articles. And I discovered that nobody knows what causes breast cancer. Some risk factors have been identified, but a cause has not.

Knowing what causes a disease is central—and critical—to both preventing it and curing it. If the cause of a problem is unknown, all you can do is treat the symptoms and hope it does not reappear. And if the cause is unknown, you cannot make certain that the treatment is not making things worse. In other words, you may treat the symptom, but that treatment may cause further problems.

Naturally, it's important to treat symptoms that are immediately life threatening. We may not know the cause of breast cancer, but avoiding treatment because of this lack of knowledge may lead to death. On the other hand, how do you select among treatment alternatives without knowing the cause of the problem?

If the treatments were free of hazards, this would not be critical. Some health practitioners, for example, suggest that vitamin C can stave off a cold when taken at the first sign of a sniffle. Popping a vitamin C pill cannot hurt, even if the sniffle turns out to be an allergy, not a cold. It's better

to be safe than sorry if the treatment will not hurt you. But is this the nature of cancer therapy?

The primary treatments for breast cancer are chemotherapy, radiation therapy, and surgery. But chemotherapeutic agents are toxic chemicals, and many can themselves cause cancer. They often bring additional misery and debility to people already damaged by cancer. For Soma, who was pregnant, this type of treatment was out of the question. Radiation therapy, a known cause of cancer itself and a highly debilitating procedure, was also unacceptable. And while surgery can remove affected breast tissue and lymph nodes, the side effects of a swollen arm and a changed body and personal appearance were not a comfortable alternative, either. And even with new surgical techniques that promise to be less damaging to the body, the thought of losing a breast is a nightmare for any woman.

When we realized that these treatments are offered without any knowledge of the cause of the breast cancer, we decided to search for other alternatives.

SEARCHING FOR A CURE

We turned to alternative medicine to find some possible solutions. Throughout this century, numerous cancer treatments have been suggested. Claims have been made for vitamin A, beta-carotene, vitamin C, shark cartilage, laetrile, garlic, clay, various herbs and medicinal plants such as Pau d'arco, chaparral, clover, and burdock, and other products. Some practitioners of repute claim great results with these alternative therapies. Others sound absurd in their claims. All engage in a political battle with the medical establishment over validity and over the freedom of patients to choose these alternatives.

While most of these forms of alternative cancer therapy seem less hazardous than chemotherapy, radiation,

and surgery, they are all treatments. A cure is more than a treatment. You can treat a tumor with something that can kill it, but if the initial cause of the tumor is not eliminated, a cure will not be effected. In fact, many cancers return following treatment and the apparent removal of all tumor masses—which means the patient was not *cured* of cancer. Even if the treatment strengthens the immune system, as some alternative therapies claim to do, the initial cause of the weakened immune system must still be addressed.

Soma and I researched breast cancer, trying to find the real enemy that had caused her breast tumor. If we could find the true cause of this disease, we could better assess treatment choices—and we could prevent it from recurring. What we discovered is that medical research has been looking for the enemy in the wrong places. In fact, the symptoms have been mistaken for the problem.

When you examine the basic viewpoint of medicine, it is clear that the primary focus is on the biochemistry of the body. Yes, there are researchers, such as radiologists, surgeons, and anatomists, who focus on the anatomical features of disease. And others, such as pathologists, examine the shape of diseased cells and organs. But for the majority of practitioners of modern medicine, diseases and therapies are defined in terms of subcellular molecules and functions. Proteins, fats, carbohydrates, vitamins, minerals, enzymes, nucleic acids, and other biomolecules are considered the essential units of the human body.

According to these practitioners and researchers, disease is best addressed by examining the interaction between these biomolecules. Geneticists, biochemists, pharmacologists, microbiologists, physiologists, and every health care provider who prescribes drugs, vitamins, minerals, or other chemical substances is focusing on this microscopic world within our cells. Cancer is approached

in these biochemical terms, as well. Hence, the bulk of biomedical cancer research studies hormones, DNA, mechanisms of cellular division, and other microscopic molecules and functions.

Since the focus of such research is on the inside of cells, little concern has been paid to the types of cells studied. As a result, much of this research does not even take place on people. Tissue culture and animal studies constitute the vast majority of cancer research. Are there problems in studying tissue cultures and animals to discover the cause of human cancer?

THE HUMAN ENVIRONMENT

Scientists refer to tissue culture research as *in vitro,* meaning "in glass," as opposed to *in vivo,* meaning "in a living body." The limitations of in vitro research, which are recognized by scientists, is that the results are of unknown relevance to living, whole organisms in which a complex interaction of various organs and systems occurs. Sometimes cells that are cultured take on different characteristics and behaviors in their petri dish than they would have assumed in the body. This means that the environment in which a cell lives is important in determining how it functions. A controlled environment inside a glass or plastic lab dish is different from that inside a living body.

In short, we come back to the fact that the whole is greater than the sum of its parts. You cannot understand the part—a cell—in isolation from the whole—the body in which it normally lives. And you cannot understand the body by examining a culture of one of its cells. Yet this is exactly what in vitro research tries to do. You can see how limited, if not outright misleading, such an approach can be.

In vivo studies have the advantage of examining whole organisms. The liver, kidneys, hormones, nerves, and other

bodily systems interact in living organisms in ways that cannot be simulated in vitro. However, it is important to know which species of organism you are studying and which one you want to learn about. They should be the same—but usually are not. Cancer research that is intended to find a cure for human cancers is frequently performed on rats, dogs, mice, or other nonhuman animals. Naturally, all species of animals are different, as are their forms of cancer. Breast cancer in a twelve-month-old mouse that has been genetically designed to develop cancer (which is the type of animal used in some breast cancer research) is not the same as breast cancer in a sixty-year-old woman. Even animal researchers admit that results from such cross-species studies are of unknown relevance to humans.

Given the obvious pitfalls of tissue culture and animal studies, why are they the mainstay of human cancer research? Because the scientists conducting them are specialists on the inside of cells. They are biochemistry focused. Connections between the cells and the whole of the body are lost when the mind is focused on the inside of cells, just as one loses sight of the forest when focusing on the trees. And sometimes, as with animal studies, the trees studied may not even be in the right forest!

Since their battlefield for fighting cancer is the cell, researchers try to attack cancer by acting on the internal functions and contents of the cell. This is why chemotherapeutic drugs are used. They are designed to attack cells, hopefully those that are cancerous more than those that are healthy. But when you look only at cells, and not at their connections to one another within the whole body, you may kill the cancer but lose the patient.

IDENTIFYING THE ENEMY

Why do women get cancer of the breast? What is the real

enemy? Though certain breast cancer risk factors have been identified, their connection to the disease is not clear. Some of the mechanisms through which cells become cancerous have been discovered. Toxicity and some genetic factors have been linked with the development of cancer. And certain behaviors have been associated with breast cancer. But the root cause of breast cancer remains unknown. And it deserves repeating that you cannot cure breast cancer without addressing its cause. You can treat it each time a tumor appears. But you cannot cure it.

Just as Soma and I turned to alternative medicine in our search for the optimal solution, so are more and more people today looking for alternatives to so-called orthodox cancer therapy. To the holistic, or alternative medicine, practitioner, the battlefield for fighting cancer is the entire human body. Such holistic practitioners include homeopaths, naturopaths, chiropractors, acupuncturists, massage therapists, and herbalists. In this medical camp, cancer is not defined as a cellular phenomenon whereby cells divide without limit, taking over the body and killing the host. Instead, cancer is seen as a product of a weakened immune system and an overburden of toxins. To these health practitioners, then, cancer is a different enemy than it is to orthodox practitioners. Instead of the goal being to simply destroy the tumor, the goal is to enhance the body's own immune system to rid itself of the tumor. As a result, nutrition has become a main focus of holistic medical advice, since it is through proper nourishment of the body that optimal health and immune function can be achieved.

Along with nutrition, holistic health advisors recognize the role of stress in health and emphasize the importance of exercise, relaxation, and other lifestyle practices that are associated with good health. Here we see an appreciation of lifestyle as the cause of disease. However, these lifestyle practices are usually regarded as isolated

behaviors, disconnected from the culture that generates and sustains them. Examining lifestyle factors in isolation from their cultural context is as limited as studying biological symptoms of disease, such as a fever, without appreciating how the entire body works. For example, when a heart disease patient is advised to do more exercise, an examination should be made of the patient's overall lifestyle to determine why he has found it difficult to fit this activity into his day. Increased exercise may not be possible for the patient, given his present lifestyle.

Why do people choose certain lifestyles? How and why can certain dangerous lifestyles, such as cigarette smoking, continue despite the known health hazards? How are lifestyles developed and sustained? How do people learn their lifestyles? How can lifestyles be altered, given their connection to other cultural factors? Are people aware of their lifestyles? These questions are outside the field of holistic medicine, despite its realization that lifestyles are important.

The distinction, then, is that whereas orthodox medicine regards cancer itself as the enemy to be attacked, holistic medicine regards damaging health practices—poor diet, high-stress lifestyles, lack of exercise, and environmental hazards like toxic exposure—as the enemy. Of course, holistic medicine believes that the tumor needs to be attacked, too, but the attack is likely to be launched through the patient's natural immune system, rather than being a direct blitz against the tumor.

Despite the different approaches of orthodox and holistic medicine, neither is certain of the cause of breast cancer. And like its alternative counterpart, orthodox medicine is beginning to regard people as more than a collection of cell functions. Greater attention is being paid by many orthodox health care providers to diet, stress, and other lifestyle factors. It is becoming ever more clear to the

open-minded physician that there is more to breast cancer than biochemical processes on a cellular level—that breast cancer is a symptom of a deeper problem. And without identifying this problem, treating the tumor is merely treating the symptom, not the real disease.

Clearly, the ultimate cause of cancer cannot be found solely within the cell and its biochemistry. Cells do not live in a vacuum—except, perhaps, in some laboratory dish. Real cells are parts of real people. And real people live in an environment, with all sorts of challenges and benefits. It is impossible to truly appreciate the nature of human beings, biologically or otherwise, without understanding how people live—without comprehending their lifestyles and their cultures. How people live defines what they do to themselves and how they interact with their environment. It makes people what they are.

STUDYING THE ENEMY

Some medical research does examine people and how they live. Epidemiology, which studies epidemics and epidemic diseases, explores how an infectious disease starts in a population, how a disease is distributed, and how it is possibly controlled. While breast cancer is not an infectious disease, it is an epidemic. And much epidemiological research has tried to find clues to what causes the disease. Research of this type surveys a population for specific factors such as diet, age at first menstrual period (menarche), age at menopause, and so on, and tries to find a connection with breast cancer. Through this research, several risk factors have been discovered that are associated with the incidence of breast cancer, although none explains why women get breast cancer. These factors have predictive value but not explanatory value.

Although epidemiology studies populations of peo-

ple, it is a branch of medicine, not anthropology. The variables studied by epidemiology are those associated with medical measurements: height, weight, age of first pregnancy, diet, number of relatives with the same disease, and other components of that ilk. This approach has the hazard of treating all cultures as equivalent, with its citizens regarded as statistical entities. Anthropology, on the other hand, allows for a greater appreciation of the differences between people of various cultures. Nevertheless, epidemiologists have arrived at a most important conclusion: Breast cancer is predominantly a lifestyle-caused disease.

LIFE OVER LIFESTYLE

The word *lifestyle* can be defined as a way of life that results from the values and attitudes of either an individual or a group. The key words here are attitudes and values. These are not biochemical words. They are not even alternative medicine words. They are not discussed by any of the health care specialists. Yet they determine how we live and how we die.

It is to fill this void in the breast cancer research field that we have employed ourselves as medical anthropologists. Fundamental to our approach is a view of people as cultural entities. Culture determines how we behave. It defines our attitudes and values. We each have a biological makeup and an environment in which we live. How we manifest our biology in that environment—what lifestyle we choose—is determined by our culture.

As we apply medical anthropology to the examination of lifestyle-caused disease, we extend the field in a new direction. Typically, medical anthropology is the examination of the cultural aspects of medical issues. What we are doing is examining the medical aspects of cultural issues.

Some medical anthropologists focus on how a particular culture manages certain health problems. We want to know how certain cultural practices lead to particular health problems.

To describe this extension of medical anthropology into the study of lifestyle-caused diseases, we suggest using the term *applied medical anthropology*, as it highlights the distinction between applied and basic sciences. As previously noted, basic science searches for pure data—information in and of itself with no regard for the ultimate application of that information to a specific problem. This type of research opens doors of understanding without any preconceived notion of what might be found behind those doors. Typical medical anthropology is a basic science, as it tries to understand various relationships between culture and health, with no regard for changing a specific cultural practice or solving a given health problem. Of course, there are some practical problems regarding health care delivery that rely on the expertise of medical anthropologists for insights and solutions. However, medical anthropologists have not, for the most part, applied themselves to the task of identifying specific lifestyles associated with specific diseases. Such a research agenda would be considered applied research because of its application to a particular illness.

Yet the practice of identifying health-threatening lifestyles and the specific problems they create is what medical research needs, particularly with a lifestyle-caused disease such as breast cancer. That is why Soma and I have extended medical anthropology into an applied science.

In a sense, orthodox medicine has focused on the "what" of breast cancer, defining it on a cellular, biochemical, and physiological level. Holistic medicine broadens that focus to the "where" of breast cancer, adding an appreciation for environmental factors such as food qual-

ity and toxins. What we have added is a "how" of breast cancer: How do women live, given their environment and biological makeup, that results in the development of breast cancer?

This is the enemy we set out to find. The enemy is not the cell or the diet or a weakened immune system. All these are symptoms of a deeper problem. The real enemy is ourselves. It is the way we live. Three out of four people are dying from their way of life—a way of life that is the result of their attitudes and values. They have learned these attitudes and values from their culture. Cultures define who we are.

This is where the cause of breast cancer lies. And this is where our search for a cure for breast cancer really begins.

2

Making the Connection

Soma and I returned to the United States within a week of discovering her breast lump. Coming from almost the other side of the planet, we arrived home both emotionally and physically exhausted.

When Soma removed her clothes to take a much-needed shower, we both looked at her breast—the one that had come between ourselves and happiness. How different it is to see a breast as your enemy! How alienating to see part of your body become a threat to your own life!

I noticed that Soma's breasts were both outlined by dark red lines, marking the areas around her breasts and over her shoulders. The lines had been left by her bra. Before I could say anything, Soma began to rub her reddened skin. She did this unconsciously, and I realized that she always did this after removing her bra. I felt the skin. There were distinct grooves. I suddenly recalled a conversation that had taken place between Soma and a Fijian woman.

Soma had been washing a couple of the bras she had brought along on the trip. Two of them were hanging on a line to dry when a local woman ambled over, interested in discovering what the bras were. We were on a remote

island where Western fashions were rarely seen, so her question was sincere.

"It's called a brassiere," Soma explained.

"What are they for?" the woman asked.

Soma had to think before responding. How would you respond to such a question? Would you say, "They hold breasts up" to a woman who had no idea that breast shape was even an issue? Soma had never before thought of her bra as anything other than normal, appropriate clothing.

The question of why women wear bras was something we later had to research for ourselves. At the time, Soma answered, "I never thought about it before. I guess it's just the custom."

The woman had been perplexed. Taking the bra and feeling it, she asked, "Doesn't it feel tight?"

Sometimes," Soma answered. "But I suppose you get used to it."

Soma had shared this conversation with me afterward. Now it echoed in my mind as something important.

I flashed on something I had learned in animal science, back in college. I was in a barn with a veterinarian who had demonstrated how a young bull can be castrated by tying off the testicles. You need simply wrap a band around the base of the scrotum between the testicles and the body. The band constricts the blood flow and starves the constricted tissue, which eventually shrivels up and withers away.

I started to construct a theory from these puzzle pieces. Red, grooved marks from a bra indicate constriction. Could the bra somehow be constricting breast tissue, reducing circulation and causing degeneration? Could this somehow be a trigger for cancer?

I shared my ideas with Soma. She thought for a moment, and then her face lit with excitement. "I have a friend who got breast cancer at the age of thirty-six. She's a little

overweight, and I remember seeing indentations that her bra made even through her clothing. She's always been really uncomfortable with her breasts, and likes to keep them snug inside a bra. She confided in me that she slept with her bra on, wearing it virtually twenty-four hours a day!"

Could this possibly be a lead? Could the wearing of bras have something to do with breast cancer?

VICTIMS OF FASHION

Clothing is something that none of us are born with, yet all of us learn to consider an extension of ourselves. This extension has both substantive psychological and physical implications. Clothing imparts a distinctive appearance to its wearer, indicating gender, social status, occupation, fashion consciousness, and sexuality. However, clothing does more than transform appearance. A snug-fitting garment becomes a type of shell, forcing the soft tissue inside to conform to certain shapes and dimensions.

But a human being is not a snail, which can live inside its shell, adjusting its anatomy to the contours of its covering. When we change our physical features with clothing, we change more than our appearance. We change the way our bodies work, resulting in many health problems.

For example, shoes are notorious for causing a host of health problems. Feet were not designed for enclosure in an airless, snug, stiff case. For one thing, this lack of air circulation and accumulation of perspiration leads to fungal infections, a common problem. Further, the foot is forced into conforming to the shape of the shoe, which it sometimes does not wish to do, leading to corns, distorted feet, and poor circulation. Women who wear shoes with narrow toes and high heels throw their entire bodies off balance, resulting in back problems and hip troubles—not

to mention stunted hamstrings, bunions, hammertoes, and the hazards of a fall.

Underwear is another garment with known health risks. In men, fertility can be affected. The use of briefs has been implicated in male infertility because this type of underwear holds the testicles close to the body, not allowing them to cool properly. Testicles do not like to be overheated. Sperm need to be kept below body temperature to stay fully functional. In women, panties with nylon, rather than cotton, crotches have been associated with yeast infections. Nylon does not absorb perspiration and other secretions and does not circulate air as well as cotton, creating a warm, moist environment in which yeast can thrive.

Going back in time, corsets, popular from the seventeenth century until the early twentieth century, squeezed women to the point of serious internal damage and deformity. The corset did to the female body what tight shoes do to the feet. But the body cavity is filled with soft organs, not just muscles, tendons, and bone, as are feet. Consequently, the pressure on the body caused circulatory problems, breathing difficulty, and lower back distortion, as well as other health problems.

In 1986, the medical journal *Annals of the Rheumatic Diseases* presented M. DeSilva's article "The Costoclavicular Syndrome: A 'New Cause.'" Researchers discovered that obese, heavy-breasted, middle-aged or elderly women were experiencing neck, shoulder, and arm pain as a direct result of compression on their shoulders by narrow brassiere straps. Some women developed permanent grooves in their shoulders from bra straps, with the compression leading to impairment of the nerves going down the arms and to the hands. These women also developed rounded shoulders due to the strain from their bra straps. This same syndrome was first described in soldiers with knapsacks

who developed pain, numbness, and fatigability of the arms as they stood at attention.

In another study performed in Germany, shoulder straps of bras were shown to produce lesions on the shoulders of obese women with large breasts. Yet another study identified the bra straps worn by large-breasted women as the cause of tingling and nerve trouble of the little fingers. Written by G. Letterman and M. Schurter, the article about this study, which appeared in the *Annals of Plastic Surgery* in 1980, pointed out that large-breasted women resort to tight bras for support, leading to the above-mentioned problems. In fact, tight bras are known to do more than produce shoulder lesions and nerve problems. According to a 1980 article by N.K. Kochenour printed in *Clinical Obstetrics and Gynecology*, tight bras have been shown to interfere with the new mother's ability to produce milk.

There is clearly a history of clothing—specifically tight or intimately fitting clothing—negatively affecting health. Could there be a clothing connection with breast cancer? Put differently, could bras cause cancer in the breasts?

Bras have, of course, come to be considered a normal part of female fashion in the Western world. In the West, a young woman's coming of age is associated with her first bra. It is a ritual of our time. Here we see the effect of cultural assumptions on a person's world view. Some cultures have a ritual for menarche, a girl's first menstrual period. In the United States, menarche is not an important cultural landmark, but developing breasts is considered a significant event.

Given this ritualistic passage in a woman's life, it is no wonder that bras are not viewed as an unnatural cultural phenomenon that might have a negative impact on a woman's breasts. Human breasts have developed over hundreds of thousands, if not millions, of years without constraint. It has been biologically impossible to adapt to

bras in the short time since their invention. Women's breasts were clearly not designed by nature to be shaped the way bras try to shape them. If breasts were so designed, women would not need bras to achieve that shape.

A PERSONAL DECISION

Before long, Soma stopped wearing her bra, just to be on the safe side. At first she felt strange and self-conscious without one, but within a couple of weeks she began to feel more comfortable than ever—despite the fact that one of her breasts had a lump. Removing her bra allowed Soma to experience her breasts in a way that bras did not permit. Without a bra artificially constraining them, her breasts felt freer and more natural. They felt the way your feet feel when you take off tight shoes.

Despite our initial terror at the discovery of the lump in Soma's breast and our determination to get it diagnosed quickly, we now opted to postpone the diagnosis. The fear of breast cancer has been so emphasized by the media and the medical community that our first reaction to the lump had been the panic that brought us back from Fiji. But we discovered through our research that most breast lumps are not cancerous, but are, instead, benign cysts. Many go away by themselves. Of course, the lump could be a cancerous tumor, but we had also learned that finding out for sure—getting a diagnosis—is not risk free, particularly for a pregnant woman.

As explained by Ralph Moss in *The Cancer Industry*, in a biopsy, which is the standard means of obtaining a diagnosis, a sample of the lump is removed for microscopic examination to determine whether the tissue is cancerous or normal. However, as the lump is sampled via needle aspiration, which sucks up the cells in the lump, there can

be a spread of the cells to the surrounding breast tissue. If these lump cells are cancerous, the cancer may no longer be limited to the lump, but may be disseminated throughout the breast tissue and lymph nodes. In addition to possibly spreading the cancer, a biopsy can cause tissue trauma, pain, damage to blood vessels, infection, and side effects from the anesthesia—all just for a diagnosis. The next step, of course, is treatment, none of which is safe for a fetus, not to mention the mother.

For us, then, diagnosing the lump was no longer the urgent necessity we had first thought it to be. Instead, finding a cause of the lump seemed essential, since knowledge of the cause could lead to a solution.

We decided to maintain a positive outlook. Chances were the lump was not life threatening. On the other hand, our research had taught us that benign breast lumps may be associated with increased breast cancer incidence. This means that the problem or problems that lead to benign lumps may also lead to cancer.

Yet our minds were haunted by the nagging question: If this theory about bras and breast cancer is correct, why hadn't someone else already developed such a theory?

How had the logic of this bra connection eluded scientists searching for a cause of breast cancer? Did other research lend support to this role of bras in breast cancer? Had this bra connection been made before, but for some reason been lost, forgotten, or ignored?

It is a rule of life that the simplest answers frequently provide the most profound solutions to our problems. We hoped that this applied to our newly developing theory. We pored over the literature on breast cancer, bras, fashion, and every possible related topic.

What we began to discover was amazing. Our fledgling research on breast cancer had a clear direction to follow. If we were right, our discovery could prove explosive.

3

Dressed to Kill

If you tried to read everything ever written about breast cancer, you would probably not finish the task in your lifetime. New studies and books come out almost as quickly as you can read them. The public concern over cancer, which is justified by the rising number of new cases diagnosed each year, has created a major research industry.

Breast cancer clearly plagues the hearts, minds, and bodies of women and their families throughout the industrialized world. According to the National Cancer Institute, the death rate from this disease has not changed much since the 1930s. So for the last sixty years, about the same percentage of women who have breast cancer have died each year from the disease. However, the incidence rates, which reflect the number of new cases of the disease each year, have steadily climbed over this century, reaching alarming proportions. This means that more women get breast cancer now than sixty years ago, while about the same percentage of them die from the disease. While the increased incidence figures are due in part to the increased detection of tumors, according to the American Cancer Society, there were about 46,000 women who died of breast cancer in 1993, while approximately 182,000 additional women were diagnosed with this dread disease in the

United States. In fact, breast cancer has the highest incidence of any cancer, and is the second leading cause of cancer-related death among women after lung cancer.

OUR RESEARCH MODEL

To perform our analysis of the existing breast cancer literature, we organized the information according to our research model. A research model, which is a method and philosophy for conducting the research, defines what is important to study and what can be ignored. Before you can carry out any research, you need some idea of what you are studying and how you should go about studying it. Let us briefly explain our model, which has to do with the way we perceive human beings and their diseases.

As discussed earlier, three aspects of being a human must be studied to understand the cause of disease: our biological nature, our environment, and our culture. We are biological entities who conform to and define some environment from which we obtain our resources, and we use those resources and behave in that environment according to the biases, attitudes, and standards of a particular culture. The three variables that constitute who we are as people are the what, where, and who of being a human. If we change any of these variables, we will change the others as well, although to different extents.

If someone is put into a different environment, the conditions of life that the individual must meet will also change. And an altered environment will demand new cultural information to manage the changes in life circumstances. In other words, if a person who is accustomed to life in the desert decides to relocate to the tropics, say, he will have to biologically adapt to the humidity; to changes in food and water supply; to changes in bacterial, viral, and other disease-carrying populations; and to mosquitoes and

other insect pests. To make this environmental transition, the person must know how to stay dry and keep clean, how to avoid skin problems like fungal and staph infections, what foods can be eaten and in what amounts, how these foods should be prepared, what water supply is potable, and how to avoid mosquitoes and other carriers of disease. These are cultural issues. They are lifestyle factors that must be mastered if life in the new environment is to be successful.

Alternatively, if there is a change in cultural attitudes and behaviors, people will act differently. This may alter both the function of these people as biological entities and the resources they may need from their environment. When people move from one country to another, for instance, they typically adopt the lifestyle of their new culture, a process called acculturation. Second-generation immigrants are more acculturated than their parents. As a result, they may begin to develop the diseases prevalent in their new culture, particularly those diseases associated with lifestyle, such as heart disease. They also treat their environment differently, since their new culture defines what is and what is not a resource. The foods they eat, the tools and materials they use, and the way they organize the world around them change according to their new cultural perspective.

Finally, altering how a person functions biologically can change how that person lives, as well as the resources that he or she requires from the environment. When a woman develops breast cancer, for example, the way in which she thinks, feels, and lives is markedly changed. Relationships change, daily activities become altered, and the disease becomes the focus of her life. In addition, as she attempts to regain her health, there will be new demands from her environment, such as a need for a lowered stress level, more vitamins and other nutrients, more sunshine,

cleaner air, and closer proximity to health care materials and personnel.

Soma and I took all this into account when creating our research model. What made our approach unique was not our view of people as biological, environmental, or cultural entities; such perspectives have been held by researchers in other fields. What was unique was our integration of these factors—our realization that you cannot understand people by considering any one factor without also considering the others.

In our research, we viewed women with breast cancer as constituting a subculture within society. The purpose of our research was to somehow identify the characteristics that separate these women from women in the society at large who do *not* develop breast cancer. In other words, our goal was to identify those lifestyle features that result in the development of breast cancer.

The Biological Perspective

To begin, we had to first assess the state of the art of breast cancer prevention research to date. On one hand, we tried to avoid making distinctions between the categories of biology, environment, and culture, as such distinctions suggest that these components can be examined in isolation from one another. However, this thinking does represent the academic approach to this health menace. So let us begin with the biological perspective, since this aspect reflects the strength of our modern medical research and has been explored more than either of the other research orientations.

As you may know, breast cancer research has identified certain biological risk factors that seem associated with the disease. As you read the following discussions of these factors, keep in mind that the difference between risk factors for breast cancer and a cause of breast cancer is that

the risk factors do not explain why women get the disease, only that certain factors are associated with women who do develop the disease. Causal explanations have more asked of them. They must tell how something happens. They must provide a mechanism.

Age

Age is a significant breast cancer risk factor. In general, the older a woman becomes, the greater are her chances of developing breast cancer. Specifically, a steep rise in breast cancer incidence occurs between ages of thirty and forty, followed by a plateau that occurs between ages forty and fifty-five. This is followed by another steep rise. The incidence of breast cancer in elderly women is more than double that in younger women.

Because nobody has proven a mechanism whereby the aging process leads to breast cancer, age is a risk factor, not a cause. In fact, it is essentially a statistical correlation, and may simply reflect the cumulative effect of other factors working over time. The longer you live, the more your body has been assaulted and hampered in its functioning.

Hormones and Breast Cancer

Biology-oriented research has revealed that women who have not had children, or have had children late in life; who have had an early first period, or menarche; or who have had a late menopause, have a higher risk of developing breast cancer. This information, along with data from animal research, has suggested that hormones may be involved in the development of breast cancer. Since early menarche and late menopause suggest a longer exposure to estrogens and other sex hormones, the search for a specific culprit has included examinations of sex hormones

and their precursor molecules, namely, estrone, estradiol, estriol, androstenedione, testosterone, dehydroepiandrosterone (DHEA), progesterone, sex-hormone-binding globulin, and prolactin. Some research has even looked at thyroid hormones.

Note that the risk factors are age at menarche, childbirth history, and age at menopause. So far, nobody has adequately explained these risk factors. Research into hormones has attempted to find a biochemical mechanism for these risk factors. However, while a tremendous amount of effort has gone into this area of research, the results have been disappointing. Not only has the mechanism by which the hormones cause breast cancer remained obscure, but the identity of the hormones involved is still a mystery. Why the confusion? One problem is that the breast may be exposed to different levels of hormones than can be measured in the serum or urine, which are common fluids for measurement. Breast fluid, for example, may have estrogen levels that are five to forty-five times greater than the levels found in serum.

Other research problems have to do with experimental design and models. Research involving animals has unknown relevance to humans, leading to many false assumptions and dead ends. And studies of cells in tissue culture (test tube research) cannot possibly model the complexity of the human body. Yet animal and tissue culture studies constitute the bulk of research on the link between hormones and breast cancer.

As for estrogen being the culprit, oral contraceptives have shown a mixed effect on breast cancer incidence. Well-designed studies both support and do not support the association between breast cancer and long-term oral contraceptive use in women under forty-five years of age. Studies are also inconclusive regarding breast cancer incidence and estrogen replacement therapy (ERT).

The Genetic Factor

Other biology-oriented researchers have examined the genetic nature of breast cancer. It seems that women with first-degree relatives—a mother and/or a sister—who have had breast cancer have a higher risk of developing the disease themselves. However, the extent to which this association may be due to culture is not known. That is, in addition to their common biological factors, women of the same family have some common cultural factors. The relative contribution of these factors in the development of the disease has not been determined. However, according to researcher B. Newman, et al., in the article "Inheritance of Human Breast Cancer," published in the *Proceedings of the National Academy of Science,* it is estimated that approximately 5 percent of all breast cancer cases might be attributed to genetic makeup.

It is important to realize that there may be more than one cause of breast cancer. A genetic predisposition to developing breast cancer does not explain a mechanism. In other words, no one knows exactly what happens to these women biologically as a result of their genetic predisposition. Further, women without this genetic predisposition may develop breast cancer by a different mechanism. So while this genetic information is interesting at a time when geneticists are busy mapping the entire human genome (genetic makeup), it does not really illuminate the cause of breast cancer.

The Dietary Factor

Biology-oriented researchers have also looked at dietary factors as a possible cause of breast cancer. While a dietary connection was theorized because of population differences in the development of breast cancer (which will be

discussed later), the majority of diet research has focused on animal studies. This line of research is thus plagued by the unknown relevance to humans of results in nonhumans, creating conflicting conclusions of different studies, depending on the species or strain of animal chosen and its idiosyncratic response to the research conditions. The results of these studies, combined with some epidemiological studies—studies of the causes, distribution, and control of diseases in populations—have shown a correlation between fat intake and breast cancer. However, researchers may be ignoring some Western dietary realties.

Part of the problem with research into diet is that the *quality* of the food is overlooked. Studies on fats in the diet rarely, if ever, consider the fat in terms of pesticide, herbicide, fungicide, and processing chemical residues. All that is typically considered is the saturation of the fat and the number of grams consumed. But many toxins, such as pesticides, are fat-soluble—they concentrate within the fat of a plant, in the cream portion of milk, and in the fat of an animal. Therefore, the cancer-causing potential of fatty foods may simply be a reflection of their toxin content. Fats themselves, which have been consumed throughout history, may be no problem at all. As research into toxins as a cause of cancer evolves, perhaps this huge oversight may be corrected. Otherwise, we cannot know whether the problem is the fats or the toxins found in the fats.

Another problem with dietary studies is that they ignore the broader cultural context in which people eat food. In medical research, diet is examined in biochemical terms. It is equated with nutrient consumption. Dietary analysis includes carbohydrates, fats, proteins, vitamins, minerals, and other chemical components of the food consumed. But is this the way to understand how people eat and how their food can affect their health?

Eating is a broad behavior. It includes how and when the food is prepared; when, in what quantities, and with what frequency it is consumed; the stress level of the environment in which the food is eaten; the extent to which the food is chewed or cooked; the combination of ingredients in a meal, since some foods have different effects on the body when consumed with certain other foods; and one's general health, since this affects digestion and appetite, including one's exercise and activity level.

Dietary analyses usually ignore these important features of diet and reduce the entire eating process to the consumption of certain nutrients. Given this limited focus, it is little wonder that dietary research into the cause of breast cancer has proven confusing and contradictory.

Some promising but inconsistent results have come out of studies on vitamin A, beta-carotene, retinol, serum vitamin C, vitamin E, and selenium. Individual studies have shown a slight protective effect of one or another of these micronutrients.

Studies on alcohol consumption as a cause of breast cancer have also been inconclusive. The differences observed in some studies may be due to differences between the women who drink and those who do not drink, not to the alcohol itself.

Other Biological Factors

Obesity, which is the term used to describe weight gain that is 20-percent higher than the ideal weight for the individual, has also been shown to be a risk factor for breast cancer in postmenopausal women. How can this be? Again, obesity is a risk factor, not a cause, so the connection is not clear. However, while the previously discussed hormone research has proven inconclusive at this time, many researchers nonetheless consider hormones to be part of

the cause of breast cancer. Obesity is rationalized as a risk factor due to the higher conversion of androstenedione to estrogen in fat tissue, and to the lower levels of sex-hormone-binding globulin found in obese women when compared with thin women.

Breastfeeding has traditionally been considered irrelevant as far as the development of breast cancer is concerned. However, recent evidence cited by the La Leche League and several epidemiological studies has suggested that the longer a woman breastfeeds, the lower her chances of developing breast cancer. The rationale offered to explain this data is that breastfeeding may alter breast tissue and its hormonal environment and exposure.

The Environmental Perspective

The term "environment" can be used to describe both an individual's physical environment—the place in which he or she lives—and an individual's human or cultural environment. The following discussion will explore only those risk factors posed by the physical environment. Following this, we will look at the cultural environment.

Toxins

When we talk about toxins, we are referring to a variety of chemical substances that act as poisons in the body. Some of these chemicals can induce immediate symptoms such as vomiting, choking, or dizziness. Cancer-causing toxins are usually less obvious in the damage they cause, at least until a tumor or some other sign of a malignancy appears. Sometimes, the cancer appears many years after the toxin exposure, making the identification of the offending toxin a difficult research task.

To date, many chemical substances—including some

pesticides, herbicides, fungicides, plastics, industrial waste products, and other products of our chemical age—have been shown to cause cancer. Some researchers, such as those at the World Health Organization, believe that toxins are the primary cause of cancer. Several chemical toxins have already been implicated in the development of breast cancer. Thus far, however, no one has discovered a single toxin that can explain the epidemic proportions of this worldwide disease.

One reason for this lack of a specific toxic culprit has to do with the nature of toxicology research. Toxicologists predominantly rely on epidemiological evidence, tissue culture studies, and animal research for their findings. Epidemiological research studies can show that, for example, workers with a shared occupational exposure to a certain chemical tend to develop the same cancers. With knowledge of this circumstantial evidence, the toxicologist goes to the laboratory and tries to use that chemical to create cancers in animals and in tissue cultures. Of course, the animal and tissue culture studies are not necessarily predictive of human responses, preventing the results of such studies from being definitive. Yet, it is through the connection of various pieces of evidence that the puzzle is put together to reveal a chemical that is responsible for certain cancers.

Apart from the problems inherent in any animal or tissue culture study, there is a built-in assumption in toxicology research that may have led much of the studies astray. Toxicologists and biochemists who try to link a toxin to a cancer must explain how the toxin preferentially targets a specific organ. Usually, this can be explained by physical contact, like that which occurs when nicotine comes in contact with lung tissue. But how does a toxin enter the body and selectively attack the breast tissue? An explanation of the specificity of the toxin for its target

organ is critical in explaining the mechanism of its action. Without this explanation, you cannot be 100-percent certain that it was a given toxin, and not some other toxin or some separate factor, that caused the cancer.

The trouble with this line of research is that it focuses on how the toxin gets into the tissue, and not on how the body rids itself of the toxin. People are exposed to many toxins throughout the day, every day, in modern America. Why aren't we all sick all the time from these toxins? How does our body repair damage done and expel the offending chemical? Instead of looking at the body as a helpless bystander waiting to be assaulted by toxins, we should view the body and its immune system as actively fighting toxins and repairing the damage they cause. With this wider appreciation of the role of the body in maintaining its own integrity and health, we can reframe the toxin question and look for ways in which the body might be prevented from cleansing itself of toxins. Could breast tissue, for example, be assaulted randomly by various toxins, but—more than other tissues of the body—be prevented from cleansing itself of these substances? By reexamining breast cancer occurrence in light of this suggested mechanism, perhaps we can gain greater insight into the cause of cancer.

Country of Origin

The area of the world in which a woman lives appears to be another environmental breast cancer risk factor. The incidence and mortality of breast cancer has been found to be highest in North America and northern Europe, intermediate in southern Europe and Latin America, and lowest in Asia and Africa. In recent years, there has been an increase in the incidence of breast cancer in younger women in Asia, central Europe, and South America.

Might this pattern of breast cancer incidence be the result of heredity, and not environment? It is known that Japanese women who have immigrated to the United States have breast cancer incidence rates equal to those of women who live in Japan. These women have one of the lowest breast cancer rates in the world. However, second- and third-generation Japanese-American women have incidence rates that approach those of American-born Caucasian women. This evidence suggests that the place where a woman lives—the natural environment and/or the human (cultural) environment—rather than heredity, is a major player in this disease. Other cultural studies shed further light on this topic.

The Cultural Perspective

Some research has examined the cultural background of women who develop breast cancer. In the United States, lower-than-average rates of breast cancer occur in Mexican-Americans, Japanese and Filipino Hawaiians, Native Americans, Seventh Day Adventists, and Mormons, while Jewish American women have a higher-than-average incidence of the disease. Further, according to Regina Ziegler's 1993 article, "Migration Patterns and Breast Cancer Risk in Asian-American Women," published in the *Journal of the National Cancer Institute*, Asian-American women born in the West have a breast cancer risk that is 60 percent higher than that of Asian-American women born in the East. Those with a Japanese rural background have a lower incidence than do those with an urban background. And those with grandmothers born in the East have lower rates than do those with grandmothers born in the West. The researchers concluded that exposure to Western lifestyles has a substantial impact on breast cancer risk in Asian immigrants to the United States.

Another interesting study concerns Polish women who immigrated to the United States. When compared with Polish women living in Poland, these women experience an immediate increase in breast cancer rates—although Japanese immigrants typically experience a one-generation lag before breast cancer incidence rates rise to equal those of Caucasian American women. Why the difference? According to researcher Dr. Philip Buell, while the Japanese and Polish immigrant groups studied resembled each other in that they migrated during the same decades and came from rural settings, they differed in that the Polish immigrants quickly became city dwellers. The delay in the increased risk of breast cancer for Japanese immigrants, Buell reasons, is due to a prolonged attachment to their traditional culture—an attachment better nourished by a rural setting.

Several other cultural factors also seem related to breast cancer. Specifically, higher-income women are at greater risk than are lower-income women, unmarried women are at greater risk than are married women, and urban women are at greater risk than are rural women. In addition, women living in the northern portion of the United States are at greater risk than are southern women.

THE BODY OF EVIDENCE

The above overview of available research on breast cancer risk factors does not include all of the factors that have been examined. A few researchers have examined other possible biological, environmental, and cultural factors, such as medications, emotional stress, depression, proximity to electric power lines, caffeine, and cigarette smoking. But, due to conflicting results or insufficient data, these studies, like those previously discussed, have led to no clear conclusions.

In short, in the medical literature, the major risk factors discovered to date are age, country of origin, alleged hormonal influences, genetics (a history of breast cancer in the woman's mother and/or sisters), diet, and toxins. All other factors explored in mainstream research are of small magnitude. In fact, according to H. Seidman's article "A Different Perspective on Breast Cancer Risk Factors," published in the journal *Cancer*, all the known risk factors can account for only about 30 percent of breast cancer cases—leaving 70 percent unexplained by established risk factors! This means that more is unknown about breast cancer than is known.

Of course, if the bra connection we had discovered made sense, we felt that it should also explain other risk factors and offer a plausible mechanism for the way in which bras exert an influence on the breast, creating cancer. As we progressed through the literature on breast cancer, our bra theory became increasingly plausible. We saw breast cancer in a way never discussed by other researchers. A fascinating picture was coming into view. To explain the theory we began to formulate, we need to understand some human physiology.

The Lymphatic System

We reasoned that bras may have an effect on the lymphatic system. The lymphatic system is part of the immune system, which cleanses the body of toxins. The general course of events in the body is that the bloodstream shuttles blood to the lungs, liver, and kidneys for cleansing and rejuvenation. Toxins are removed and excreted, and nutrients and oxygen are added. During this action, the blood is exposed to all the cells of the body because it is through the bloodstream that our cells are fed and waste material is excreted. The bloodstream is also a communication channel for the

body, allowing cells in one part—such as the pancreas—to secrete substances that will affect cells in another part—say, the buttocks. This is how hormones get around the body.

Much medical research has gone into the body's arteries, capillaries, and veins. Yet, if people had only arteries, capillaries, and veins, they would swell with water and die within hours! This is because a significant percentage of fluid leaves the capillaries and bathes the cells, but does not return to the capillaries. Instead, this liquid, which is called lymph, returns to the bloodstream by way of another vessel system, the lymphatic system.

When you remove your socks or shoes and find your feet are swollen, it is because of a backup of this lymph. When the lymphatics are not constricted by clothing or hampered in any other way, the lymph works its way toward the heart and back into the bloodstream.

Modern medicine acknowledges the important role of the lymphatics in removing particulate matter and other toxins from tissues. This cleansing of the tissues occurs constantly and is essential to maintaining the health and integrity of the body's tissues.

What does this have to do with cancer? To understand that, you need to know a little about cancer.

The Cancer Connection

Cancer is the ultimate degenerative disease. In healthy tissue, cancerous cells appear and are destroyed before they get out of control. However, assaults by toxins and other irritants can eventually lead a tissue to degenerate to the point that one or more of its cells begin to divide uncontrollably. That is, the tissue can no longer engage in the normal repair and defense mechanisms needed to fight cancerous cells. As the cells divide and divide, producing

a mass of cells called a tumor, the normal tissue is further destroyed as the tumor takes over the area.

It is believed that this process of degeneration is usually the consequence of years of exposure to toxins. Of course, not every exposure to toxins causes cancer, or we would all be dead. This is where the lymphatics come into play. When a toxin enters our body through the skin, the lungs, or the intestines, it travels throughout the bloodstream and comes in contact with all of our cells—although certain organs may be spared a toxin's reach. The brain, for one, has a special barrier between it and the bloodstream that keeps certain chemicals out. The placenta has a similar defense. Apart from these possible exceptions, a toxin makes contact with our entire body.

Normally, a toxin and the cellular debris it produces are flushed away by the lymphatic system. But what if the lymphatic system is impaired in its function? If the impairment is severe, as when a tourniquet is tied tightly around a limb, there is pain, swelling, and a bluing of the oxygen-starved tissue. You would not put up with this type of pain and discomfort for long if you had any choice. Let us consider, however, a chronic (long-term) mild impairment of lymphatic function, as may occur with the use of bras. Affecting lymph vessels more than blood vessels, minimal pressure on the body can cause lymph vessels to close while leaving open the arteries, capillaries, and veins. This means that blood continues to flow to the constricted area, feeding it oxygen and keeping the tissue alive, but that the tissue develops a buildup of lymph fluid surrounding the cells. This condition, called edema, is characterized by swelling.

Why is lymph buildup a problem in the tissues? The more lymph there is, the less effective is the feeding and cleansing of the tissue. Less oxygen and fewer nutrients are delivered to the cells, while the waste products of metabo-

lism are poorly removed from the tissue. This reduces all cellular functions. Toxins accumulate, poisoning cells even further. Ultimately, long-term starvation of the tissues and accumulation of toxins can lead to degeneration.

Putting the Pieces Together

If a woman wears a close-fitting garment, such as a bra, it may cause moderate but not severe constriction of the breast tissue. Signs of this could be indentations or red marks on the skin beneath the breasts, or other indications of irritation. There may not be much pain, since the tissue is getting blood and fresh oxygen. However, there would be some swelling of the tissue, although this may not be apparent in soft, fatty tissue such as that in the breast. The bloodstream flow to the moderately constricted tissue would be essentially normal, but the tissue drainage through the lymphatics would be impaired.

Meanwhile, as the breasts are being constricted, the woman is exposed to toxins as part of everyday life in America. These toxins are delivered to all parts of her body, including the constricted area, by the bloodstream. Yet, due to poor drainage, the toxins become pooled in the constricted breast tissue. Other tissues of the body remove the toxins through normal lymphatic drainage, but the breasts, due to reduced drainage, experience longer-term toxin exposure.

Each day, the woman's lifestyle leads her to become reexposed to the toxins. The constricted tissue, still dealing with its last toxin dose, gets repolluted. This process is repeated day after day, concentrating toxins within the breast tissue. Over time, the process leads to degeneration of that tissue. At the same time, normal tissue repair mechanisms are impeded in their operation due to tissue swelling. The poorly drained tissue is bathed in toxins and

its own waste, and sees little in the way of nutrients and oxygen from the bloodstream. After years of this, cancer—the ultimate form of tissue degeneration—could result.

We would expect from this scenario that there might be other signs of lymph congestion within the breast as a result of chronic constriction by bras. Indeed, according to Vicki Seltzer's *Every Woman's Guide to Breast Cancer*, approximately 90 percent of all women in the United States will experience a breast cancer scare by discovering a breast lump during their lifetime. Fortunately, the vast majority of these lumps will be benign. However, a large number of these lumps will consist of fluid-filled sacs. What type of fluid is this? Lymph, of course!

Clearly, this lymphatic blockage mechanism, while highly plausible, requires further study. But let us now begin examining the established breast cancer risk factors and how they might be explained by this model.

THE RISK FACTORS AND LYMPH CONSTRICTION

To reiterate, the commonly cited risk factors associated with breast cancer are age, country of origin, alleged hormonal influences, genetics, toxins, and diet. Let us examine these in connection with lymphatic drainage.

Age

The older a woman, the greater her chances of developing breast cancer. This makes absolute sense when you postulate that there is a progressive poisoning of breast tissue due to the bra's constriction of lymphatic drainage. The body has remarkable recovery powers. Therefore, you would expect it to take years for the accumulation of toxins to cause healthy breast tissue to degenerate to the state necessary for cancer. As long as the blood supply to the

tissue is only minimally hampered, the breast cells will operate well enough to keep the tissue from developing obvious lesions or ulcers. Meanwhile, if our theory is correct, carcinogens damage breast cells day after day, year after year, aided by a state of lymphatic blockage.

Country of Origin

The "country of origin" cited as a known major risk factor refers to North America or northern Europe. Breast cancer is a phenomenon of industrialized nations. People in Egypt, Mexico, and other second- and third-world countries do not have nearly the same incidence of cancers in general. Could this be the result of their lower exposure to cancer-causing toxins? Probably not, since many of these poorer nations use toxic chemicals that are so dangerous, they have been banned in the United States and other first-world countries. DDT, for example, has long been banned here, but is still being sold by American corporations to developing countries. Indeed, many of our outmoded and dangerous chemical products and drugs are sold to third-world markets. These nations also have extensive air pollution in urban centers, poorer sanitation and drinking water, and large numbers of smokers. So exposure to toxins is probably not the sole reason for the first-world tendency toward breast cancer.

However, first-world women culturally subscribe to a fashion and lifestyle of bra wearing. You don't find peasant women wearing push-up bras. They have neither the money nor the inclination to purchase such garments. In short, their lifestyle and culture rationalize a different clothing sense, and bras just don't fit in. Perhaps, as a result, neither does breast cancer.

The only exception to the first-world rule of breast cancer is Japan, which has one of the lowest breast cancer

rates in the world. Bras, however, have not been typically worn in Japan. Traditional Japanese clothing involves kimonos and other loose-fitting clothing that does not accentuate the breasts. Bras are Western in style, not Eastern. And breast cancer is predominantly a Western, not an Eastern, problem, although recent trends suggest this may be changing as the East becomes more westernized.

This cultural difference in the use of bras could explain why second- and third-generation Japanese-American women—whose style of dress is Western and therefore includes the wearing of bras—exhibit the same incidence of breast cancer as that found among American-born Caucasian women. Further, evidence that immigrants from rural Japan have lower incidence rates than do urban immigrants may reflect the urban bias toward Western fashions. Japanese women who do wear bras are likely to be urban dwellers.

We can now also make sense of the data suggesting that young women in Asia, central Europe, and South America are experiencing an increased incidence of breast cancer. As Western fashion sweeps across the globe along with other aspects of Western culture, bras increasingly find their way into previously bra-free cultures.

We also see that different cultures in the same environment have different breast cancer rates. Native Americans, who typically do not wear bras, have a breast cancer incidence akin to that of non-Western cultures. When we compare Indian women in New Mexico with white women in New Mexico, we see that white women have about a four-fold greater breast cancer incidence rate, according to the International Association of Cancer Registries. While this difference may be partially due to as yet unexplored genetic and dietary factors, it may also be due to differences in cultural attitudes and behaviors towards breasts and bras. The same applies to Filipino-American and Japanese-American women living in Hawaii, who have a lower

incidence than European-American women living in Hawaii. Their origin in cultures that do not wear bras may predispose these women to avoid them.

Hormonal Influences

Bra wearing could explain some risk factors that have thus far been considered, although not proven to be, hormonal in mechanism. We can now see how cultural practices—specifically, bra wearing—could change the way hormones normally affect the breasts, since the bra effectively alters the anatomy and physiology of the breast itself.

Estrogen levels inside a woman's body go through normal monthly fluctuations that accompany the menstrual cycle. Just as the uterus becomes prepared for a possible pregnancy, so do the breasts become prepared to feed a possible baby. By the end of a woman's cycle (before her period), the estrogen and progesterone levels are normally higher than at any other time of the month. This is the time that a woman's breasts are naturally enlarged and sometimes sore and tender. What causes this enlargement? Extra lymph. Most women discover lumps in their breasts during this time of their menstrual cycle. In young women, who are considered at low risk for breast cancer, physicians typically recommend that the woman wait a few weeks to see if the lump goes away—and it usually does. But nobody has understood why these lymph lumps occur in the first place.

We now may have an answer. At the end of her cycle, a woman's breasts are larger than at other times. However, women typically wear the same size bra throughout the month. During times when her breasts are enlarged due to her high hormone levels and heightened lymph flow, constriction from the bra will be at its greatest. This can lead to obstruction of the lymphatic drainage and the development of lymph-filled cavities, which are experienced as

lumps. When the cycle starts over and hormone levels decline, swelling is reduced and the lumps go away.

Estrogen, then, may be associated with breast cancer because it makes breasts larger and bras more constricting, allowing toxins to build up in the breast tissue.

As mentioned earlier in the chapter, childless women have a higher incidence of breast cancer than do women who have had children. Can this be explained by the bra connection? With pregnancy comes a greater blood supply to the breast and greater lymphatic drainage of the tissue. The breasts of childless women do not have a chance to undergo full development—development that includes their lymphatic system. Given their underdeveloped drainage system, it follows that constriction of the breasts with a bra could cause even greater damage, further compromising an already limited drainage system. Women who have not breastfed also have a higher incidence of breast cancer, possibly because of this same mechanism.

The age at which a woman has her first child is also considered a breast cancer risk factor. The older a woman is when she gives birth for the first time, the greater her chances of getting the disease. While the reason for this connection is not clear, it has been used to explain another finding. Occupation, a lifestyle factor, also affects breast cancer incidence. Professional women have higher breast cancer incidence rates than do nonprofessional women and homemakers. It has been discovered that, in general, professional women have children at older ages, somehow predisposing them to the disease.

Both of the risk factors just discussed—being a professional and having a first child at an older age—can be explained more thoroughly, given the bra connection. Professional women typically have the need to wear a bra for a longer period of time each day than do nonprofessional women and homemakers. In addition, having a first child

at an older age delays the development of the breasts and their lymphatics. Wearing bras and delaying breast development by having a later first child may work together to set a woman up for breast cancer.

Early menarche, another breast cancer risk factor, also makes sense in light of our theory. An early first period can lead young women to enter the adult lifestyle of wearing bras early on. Marked by a ritual of receiving the first bra, young women are supported by our culture in adorning their developing breasts. The desire for even larger breasts, a Western cultural preoccupation of young and old women alike, can lead these young adults to wear padded or push-up bras, both of which can constrict their undeveloped breasts.

Yet another breast cancer risk factor is late menopause. Menopause is a time when a woman's body and her hormones change. The breasts are no longer needed to nurse a possible infant, so that they slightly atrophy, reducing in size. A woman who enters menopause early in life experiences this breast size reduction sooner than does a woman with a late menopause. In turn, this breast reduction may allow the breasts more room inside the bra, reducing constriction of the lymphatics. This could explain why a late menopause is associated with higher breast cancer rates.

On the other hand, a frequent change associated with menopause is weight gain—an occurrence that, in turn, increases breast size. This clearly increases the tightness of a bra. Further, larger bras have thicker side panels that can cut off even more of the lymphatic drainage of the breasts. Of course, overweight premenopausal women have this same problem. But, interestingly, obesity is considered a risk factor only in postmenopausal women. How can this be explained?

During menopause, the breast tissue undergoes certain changes. As an organ no longer needed for its biological purpose, the breast's tissue structure, including its lym-

phatics, loses some of its integrity. Obesity then places a greater demand on a lymphatic system that has already been compromised by the changes associated with menopause. The combined effect of large breasts, bra tightness, and aged lymphatics may explain why postmenopausal obese women have higher breast cancer rates.

Incidentally, we may now better understand why a particular toxin has not been implicated in the development of breast cancer. Without a mechanism for targeting the breasts, a toxin would not be breast cancer specific. But research identifying a toxin with a built-in breast tissue preference is not necessary if a mechanism unrelated to the toxin could be found. Bra wearing may be this other mechanism, as it causes toxins to become concentrated in the breast tissue. This bra mechanism also implies that more than one toxin can cause breast cancer. Any carcinogen that becomes concentrated in the breast tissue by a bra can do damage to the breast.

Genetics

As for the genetic basis of breast cancer, it is possible—although it has not been researched and proven—that some women have an inherited problem with the lymphatic drainage of their breasts. On the other hand, the genetic mechanism may lead to breast cancer through a means unrelated to lymphatic drainage, but related instead to some other limitation in the ability of the breast tissue to detoxify. Clearly, more information is needed to understand this genetic connection.

Toxins

The reason that women experience cancer of the breast more than cancer of any other tissue may be explained by

the constriction of the breast lymphatics by a bra. As already discussed, the search for breast cancer toxins must consider the immunologic, protective functions of the body in preventing toxin damage. When the removal of the toxins from the tissue is hindered, the breast experiences toxins for longer periods of time. So it's not how the toxins enter the breast that's the problem, but how they get out—or don't get out. In our culture, no part of the female body is as highly constricted, or constricted for as long a time each day, as are the breasts. Thus, the breasts may be inadvertently selected by our clothing fashions as the target for toxin damage and, in turn, for cancer. This mechanism may make breast cancer the number-one malignancy of American women.

Diet

Diet has been examined as a possible risk factor for breast cancer because of studies which show that breast cancer is a lifestyle-associated disease. When Japanese women increased their daughters' risk of developing breast cancer by simply moving to America, researchers immediately postulated that an altered diet may have caused the problem. Further, in dietary research, it is assumed that human physiology is constant across cultural lines.

We now see some problems with this simplistic approach to diet. When people change cultures, types and levels of pesticides, herbicides, fungicides, and other chemical contaminants in the food, water, and air change as well. As a result, animal fats, for example, may have entirely different chemical contamination profiles in different areas of the world. Further, human physiology may be changed by the use of constrictive clothing such as bras. Therefore, what has up to this point been viewed as a dietary contribution to the development of breast cancer,

may actually be the introduction of toxins through the diet—and, most especially, through the fatty portion of the diet—followed by the constriction of the lymphatic system by bras. The constricting bras impair the function of the lymphatics, keeping the diet-introduced toxins in the breast, and triggering the growth of cancer.

As you can see, lymphatic drainage problems that may be caused by bras could help explain most of the risk factors commonly cited for breast cancer. The bra connection thus passes the test of having wide application to many women, and helping us connect and understand many other risk factors.

We mentioned at the beginning of this chapter that people can be understood from the perspective of biology, environment, and culture—the what, where, and who of being a human. We can now see how the effect of bras enters into each of these aspects of being a woman. Because of the cultural bias toward wearing bras, women have altered the environment in which their breasts exist. This, in turn, has altered the biological state of their breasts.

A PERSONAL REEVALUATION

At this point in our research, Soma began to do everything she could think of to increase the lymphatic flow in her breasts, particularly the one with the lump. When time is of the essence, you try anything that seems possibly beneficial, as long as it involves little, if any, risk.

Meanwhile, we anticipated the birth of our baby with intense anxiety. What would be his world as an infant, we wondered? Would he find peace and contentment at his mother's bosom? Would he discover early in life what pain and suffering can do to a family? Would he have to learn what it is like to mourn the death of his mother?

4

The Big Picture

Now that we have explained the development of our theory linking breast cancer to the wearing of bras, let us make the following statement: Bras do not cause breast cancer.

Are we contradicting everything we have thus far stated?

No, we are simply refining our statement. Bras are not the *cause* of breast cancer, but they may be a *trigger* for it. And were it not for toxins and other noxious stimuli that turn normal cells into cancerous cells, bras might lead to some degeneration of the breasts *other* than cancer. Let us be clear about this: No tissue, including breast tissue, likes to be constricted. Bras may be a health problem even in the absence of cancer-causing toxins. The appearance of so many lymph-filled breast lumps is possible evidence of this hazard.

Cancer is a complex topic, involving a multitude of factors. We must examine these factors more closely so that we can better understand how bras do more than create a fashionable profile.

AN OVERVIEW OF CANCER

The statistics paint a grim picture. According to the American Cancer Society, cancer is a disease that accounts for

more than 450,000 deaths annually in the United States. It is estimated that 30 percent of all Americans will develop cancer, and that two thirds of those who do will die of the disorder. During the past twenty- five years, cancers of the skin, breast, pancreas, bladder, and testes have increased in incidence.

The need for a new approach to cancer prevention became obvious as we searched the literature for information about breast cancer. Despite all the medical wizardry of our day, with CAT scans, MRIs, powerful drugs, and hundreds of laboratory tests, including genetic screening, cancer remains a mystery to modern medicine—and a constant source of anxiety to us all.

Given cancer's prevalence in today's society, the pain and fear of it touch everyone in some way. When we think of cancer, we think not only of death but also of the suffering of dying. And beyond the misery caused by the malignant growth that consumes the body is the added suffering caused by treatments for the disease. Chemotherapy, surgery, and radiation therapy further distort the lives of cancer patients, adding physical insult to the injury of the tumor. And for most of these cancers, this added medical burden often does little to prolong life or improve survival, as many critics of cancer therapies have emphasized. In fact, according to several studies cited in Ralph Moss's *The Cancer Industry*, cancer patients who opt for no treatment frequently live as long or longer than do those who choose standard therapies.

The risk factors that have been identified by the medical establishment, which we cited in the previous chapter, hardly provide women with tangible advice on how breast cancer can be prevented—and it is prevention we must seek. As that much-quoted old adage wisely states, an ounce of prevention is worth a pound of cure.

The medical profession has not been deaf to the public's pleas for help, of course. Regarding breast cancer,

doctors advise women to get regular mammograms and perform monthly self-examinations to detect tumors. But detection is not the same as prevention. Detection merely precedes treatment. Once the tumor is detected, you already have cancer! The doctor will then recommend the usual array of cancer treatments, fulfilling the worst fears and nightmares of the woman whose life has just been shattered.

Cancer Defined

What exactly is cancer? The term *cancer* is used to describe any malignant tumor. A tumor is simply an overgrowth of tissue that can occur in any part of the body, and that need not be a problem. Moles are tumors. But cancers, unlike moles, are malignant tumors.

According to the definitions provided in most medical texts, the term *malignant* describes any disease that is resistant to treatment and of a fatal nature. In the case of a tumor, it means that the tumor shows uncontrollable growth and the ability to spread throughout the body.

It is interesting to see the bias implied by this definition. Statements regarding the tumor's resistance to treatment and its uncontrollable growth reflect the inability of medical technology to stop the cancer. It is a treatment-oriented definition. This means that what is malignant today may not be so tomorrow, provided that new treatments are developed to stop the tumor's growth and spread.

There is a certain fatalism to this definition. When you think of malignant cancer, you think about the inability of modern medicine to control the tumor, with death as the expected outcome. It is perhaps because of this fatalism that people tend to overlook the fact that the body develops cancer cells all the time without developing cancer.

We are composed of trillions of cells. The small prob-

ability that a mutation will occur in some of them at any given time is large when you consider the number of cells we have. To manage the cells that constitute the body, each tissue follows some inherent rules of operation. Through certain chemical and electrical messages, cells are given specific functional roles within the tissue. Some cells function as factories to synthesize and secrete substances such as enzymes or hormones; other cells have structural functions, and act like a glue to maintain the integrity of the organ; other cells line the blood vessels and mediate the transfer of nutrients and waste with the bloodstream; and still others operate as channels for the cleansing and draining of the tissue, composing that tissue's lymphatic system.

Every cell of our body has its place and is connected to every other cell. We are integrated entities, a phenomenal orchestration of specialized tissues and organs that serve to maintain the life and integrity of the whole. Some cells, such as white blood cells and other cells of our immune system, willingly die to save the whole. Since the whole is definitely greater than the sum of the parts, there is no room for selfishness among cells and organs. The fate of all depends on the integrity and health of the whole. We innately know this within our genes, if you will.

But some cells lose sight of their connection to the whole. They lose their identities within the tissue, and begin to selfishly usurp the space and nutrients. Freed from the normal constraints that limit and control cellular reproduction, these maverick cells start to reproduce themselves, forming a tumor. If left alone, these cells soon take over the tissue and organ that once served as their guardian and master, perhaps sending tumor cells to other organs to begin uprisings there, as well.

But our organs are used to such insurrection. Our immune system squelches these cellular revolts constantly. It is when the immune system is fatigued, or is in

some other way limited in its function, that the tumor cells can get a strong enough foothold to succeed in their revolt, resulting in cancer. However, given a healthy immune system, we are typically successful in identifying and destroying mutated, tumor-producing cells. In other words, our body prevents cancer all the time.

Scientists have some theories as to how cancer cells are normally weeded out of the tissues. For the most part, this area of research is as confusing and incomplete as is the search for mechanisms that cause some cells to mutate and divide without the usual controls. But our ignorance of the mechanism should not blind us to the fact that it exists and is successful most of the time.

When we consider the standard medical definition of malignancy, the emphasis is on medical intervention designed to stop the tumor cells from dividing and spreading, or metastasizing, to other tissues. This emphasis on medical intervention, however, downplays the inherent mechanisms of our body to stem the growth and spread of the disease. Here we see a reflection of the *treatment* mentality—as opposed to a *prevention* mentality—of cancer research today. Treatment focuses on what doctors can do to stop cancer once it has begun; prevention focuses on what the body can do to stop cancer cells *before* they get out of hand, and examines ways to assist the body in maintaining its stand against disease.

The typical approach to combating cancer is to try to kill the tumor cells. Unfortunately, healthy cells are also killed in the process, which is why chemotherapeutic drugs and radiation therapy wreak such havoc on the body. For those unfortunate enough to have a malignant tumor growing within their body, it would make sense to examine all forms of intervention, mainstream and alternative, since a possible outcome of no treatment at all is death. On the other hand, as already mentioned, the pos-

sible outcome of treatment may be death, while letting the body heal naturally may result in a cure. Of course, to those without cancer, it makes much more sense to prevent cancer than to wait and treat a tumor when it appears.

When we realize that the body already knows how to prevent cancer, we see that all we really have to do is support the body in doing what it does naturally. There is no need for confusion or mysteries about cancer when it comes to prevention. From the tiniest infant to the oldest matriarch, there is a wisdom within our bodies, a "body-sense," that knows what to do, even if our heads don't have the slightest clue.

While our ignorance does not prevent our bodies from knowing how to fight cancer, it does sometimes lead us to behave in a way that keeps our bodies from operating optimally. We can take our healing powers for granted as long as we don't overburden those powers. Prevention, then, should be considered a lifestyle that enables our innate healing powers to operate optimally.

Let us now return to the definition of malignant. Instead of referring to malignancy in terms of medical intervention, perhaps it is better defined in terms of the body. Malignancy, then, is the characteristic of a tumor that has survived the inherent defense mechanisms of the body and is reproducing and spreading without normal constraints.

The advantage of this definition over the standard one is that it focuses on the processes and mechanisms of the body, not on those of medical technology. It makes us ask what we can do to assist the defense of our bodies against cancer cells—and what we may be doing to hamper a normal, healthy immune response.

The Role of Carcinogens

Since toxins are frequently implicated as a cause of cancer, let us examine them and the role they play in this tragedy.

We are exposed to toxins through our mouths, lungs, and skin. These are the portals of entry into our bodies. Our mouths ingest poisoned food and water. Our lungs breathe poisoned air. Our skin absorbs poisons from both the air and the water, as well as from the chemicals that we deliberately apply in the form of skin creams, deodorants, cosmetics, perfumes, insect repellents, and so forth.

It is accepted knowledge that many chemicals are toxic to our bodies and can cause cancer, which makes them carcinogens. Toxins can cause cancer by overworking the immune system and thereby reducing its effectiveness, by directly activating cells and transforming them into cancer cells, or by both these routes. One of the problems encountered when exploring chemical carcinogens is that our environment is filled with so many of them. When you take one chemical and test it for its cancer-causing ability, or carcinogenicity, you are studying that chemical outside of the normal environmental context, in which our bodies are exposed to more than one chemical at a time. It may be that the combined effect of a toxic environment is greater than the single effect of one chemical.

Further, the studies performed to determine a chemical's carcinogenicity often use nonhuman animals. Endless animal studies have been conducted at the cost of billions of dollars, only to prove that all animals respond to carcinogens differently, and that animal responses do not predict human results. Beta-naphthylamine, for example, does not cause tumors in animals, but is one of the most active cancer-causing chemicals in humans. You simply cannot tell whether a chemical will cause cancer in people by studying its effects on other creatures.

Yet you don't have to be a Harvard researcher to know that chemical exposure is bad for you, and that many human studies have revealed a pattern of cancer arising from extensive exposure to certain chemicals. This expo-

sure is not necessarily dramatic. You need not fall into a vat of chemicals to get cancer. A long-term exposure to low levels of toxins seems to be enough to do the trick. This makes cancer all the more difficult to prevent. If you could see the poisonous gases you breathe and watch liquid chemicals being absorbed into your skin, if you could watch your body constantly struggling to cleanse itself of these toxins, prevention would be easy. You would know that these toxins were assaulting your body. But toxic poisoning is not as obvious as this.

Hazardous Habitats and Habits

Our cultural biases can make us miss aspects of our lifestyles that are potentially hazardous to our health. Most people assume that the normal everyday world in which they live is safe from a health standpoint. But this assumption is not always correct. *Mobile home syndrome* revealed that the prefabricated pressed-wood paneling in mobile homes was emitting toxic fumes that poisoned the inhabitants, as were other glues and chemicals applied to wood surfaces. When I was a child, I remember the painter filling our apartment with chemical fumes that lasted weeks. And what about the chemicals we smell in new carpeting? Are those safe to inhale for hours on end? Water pipes have traditionally been connected with lead solder; as an alternative, many water pipes in use today are made of PVC, or polyvinyl chloride, which leaches some chemicals into the water we and our children are drinking. Chlorine and fluoride may already be in that water, having been placed there by many municipalities.

We poison ourselves within our homes each day. According to Jeremy Rifkin in the *Green Lifestyle Guide*, the average American uses about twenty-five gallons of hazardous chemicals each year. Products for our cars (anti-

freeze and oil), household cleaners (for the oven, floor, toilet, and sink drain), grease and rust solvents, paints, lawn and garden products (fertilizers, pesticides, herbicides), nail polish remover, shoe polish, glues—these and other substances virtually surround us with chemicals. And all of these products take a toll on our bodies. The immune and lymphatic systems must remove them from the body's tissues; the liver must detoxify them; and the kidneys, lungs, intestines, and skin must excrete them. While some of these chemicals do not directly cause cancer, they launch an assault against our bodies and our defense mechanisms. You can see how the body can be overwhelmed in its cleanup job, allowing cancer cells to do their dirty work.

We also poison ourselves and our families when we eat. Foods today are typically bombarded with chemicals such as pesticides, herbicides, fungicides, preservatives, and coloring agents, many of which are suspected cancer-causing agents. Some foods are irradiated, a highly controversial procedure that is thought to generate potent carcinogens within the food substance. Yet the Food and Drug Administration (FDA) admits that in terms of human health, research on these chemicals and on irradiation is scanty, if it exists at all. There is no government requirement that a chemical company prove that its weed, insect, and fungus poisons are safe for people. Further, food is not labeled according to its history of toxin or radiation exposure. Add to this the danger posed by toxins that leach out of plastic food packaging. The FDA considers the plastic in these containers to be an unintentional food additive. This loose attitude toward our food has been estimated by some experts—including a Senate fact-finding committee on cancer, chaired by Senator George McGovern—to be one of the leading causes of cancer, perhaps responsible for 35 percent of all cases.

Since many of these chemicals, including a great number of pesticides, are fat soluble, they enter our bodies and become absorbed into our fat cells. This causes the toxins to accumulate within our tissues, increasing their potential to cause damage. People who eat a diet high in animal-fat products, such as cheese, milk, meat, poultry, and so forth, consume these toxins along with their foods, as the toxins in the animals' feed accumulate in the animals' bodies and/or milk fat. This may help explain the association between high animal-fat diets and breast and colon cancer.

Of course, the home is not the only place where we are surrounded by toxins. Our occupations bring us into direct contact with toxins on a daily basis. Once considered innocuous, asbestos has now been accused of causing 50,000 cancer deaths per year, mostly of the lungs, esophagus, stomach, colon, and rectum. About 50 percent of office buildings built between 1958 and 1970 used asbestos fibers, mostly for fireproofing and insulation. As the buildings age and undergo repairs, these killer fibers can be released into the air and inhaled by those in the building.

Benzene, a known carcinogen, is found in photography supplies, spot removers, and a variety of solvents and plastics. This substance can be absorbed through the skin and through the lungs. Formaldehyde, used as a resin in the making of plywood and particle board, is also a carcinogen, and is responsible for the health problems of many office workers who are surrounded by formaldehyde-containing wood products. Nitropyrenes, contained in copy machine toners, are also suspected carcinogens, as is trinitrofluorenone (TNF), another chemical used in the photocopying process. Trichloroethane, a potent carcinogen, has many industrial, home, and medical applications, and can be found in a host of products, ranging from typewriter correction fluids to stencil cleaners.

According to toxicologist and cancer specialist Dr. Sa-

muel Epstein, synthetic versions of organic chemicals have been introduced into our environment at an alarming rate. In 1940, the United States manufactured about one billion pounds of these chemicals. By 1950, the figure had reached 30 billion pounds, and by 1980, it had reached 450 billion pounds per year. The overwhelming majority of these chemicals have never been tested for environmental effects, not to mention health effects. Virtually no health research is being performed on these chemicals, which include pesticides that go onto many of the foods that we eat.

To further add to this depressing picture, consider that during the last few decades, the chemical industry has dumped its toxic waste indiscriminately throughout the country, creating an estimated 180,000 ponds, pits, and lagoons of deadly poisons that seep into our ground water. Gasoline exhaust fills the air in urban centers, pesticides and herbicides permeate and coat our food, and industrial waste seeps into our water—dangerous chemicals that for the most part we cannot smell and are unaware of. And other forms of pollution, such as radiation, are invisible but extremely dangerous. Many of these cancer causes are avoidable, many are not—if you wish to live a "normal" life. Our culture has created a society reliant on chemicals.

The environment is the medium in which we live or die. It feeds us or starves us. It supports us or damages us. It is clean or it is toxic. It is stressful to our immune system or it supports our defenses. Clearly, our increasingly toxic world is not good for us. In terms of prevention and a lifestyle of health, it would make sense to avoid toxins as much as possible. When you smell a chemical, imagine it streaming throughout your body and possibly affecting your health.

Fortunately there is cause for hope. Not everyone gets cancer. Therefore, toxins must not be the entire story when it comes to contracting this disease.

But our toxin-disposal system, which uses the liver, kidneys, skin, and lungs to remove these poisons from our bodies, can be overworked and overloaded by too many toxins. Further, if the toxin-disposal system is not allowed to function optimally, toxins will remain in tissues for longer periods of time, causing more damage to the tissue. So apart from avoiding toxins, we might want to avoid interfering with our toxin-disposal system. Central to this cleansing system of the body are the lymphatics.

THE LYMPHATIC SYSTEM

Discovered in the mid-1600s, the lymphatic system has been a mystery to science for centuries. In *The Genesis of Cancer*, author L.J. Rather explains that throughout the seventeenth and eighteenth centuries, theories identified lymphatic-drainage problems as the cause of cancer. However, these theories were associated with antiquated notions of bodily humors—fluids that were thought to determine by their relative proportions a person's health and temperament. When medical theories shifted away from humors, the possible role of the lymphatics in cancer was forgotten in the shuffle. In fact, on reviewing the lymphatics, we were astonished by the lack of information that has been generated since the 1600s.

But a lack of attention does not mean that the lymphatic system is unimportant. It is a specialized part of the circulatory system that functions as a central component of the immune system. As we mentioned in the last chapter, it consists of fluid, called lymph, derived from blood and tissue fluid. This lymph moves through lymph vessels, called lymphatics, and is returned by these vessels to the bloodstream. A detailed examination of this system is necessary if we are to understand the role that bras may play in the occurrence of breast cancer.

The Components in Detail

Most of the human body consists of water. This fluid is divided among three compartments, which are in constant communication with one another. The largest compartment—which holds two thirds of the body's fluid, or approximately thirty quarts—is the cells themselves. The next largest fluid compartment is directly outside the cells, in the spaces between them. The twelve quarts of interstitial fluid found in this compartment bathe the cells and remain in intimate contact with both the cells and the bloodstream. Finally, there is the bloodstream itself—three quarts of fluid found in arteries, capillaries, and veins.

Lymph is the clear fluid that bathes the cells. The interstitial fluid contains cell debris, nutrients, waste products, fats, proteins, sugars, hormones, and everything else you can imagine a cell would be exposed to, including toxins. This interstitial space is the microenvironment of our cells. Clearly it is important to drain this space so that it is cleaned of debris, waste, and toxins. If the interstitial space were kept stagnant, the cells would die—starved of oxygen and nutrients, and poisoned by their own toxic waste, as well as by environmental toxins that enter the body through food, water, and air contamination. Drainage of the tissue occurs with the help of the bloodstream and lymphatics. New fluid, filled with nutrients and oxygen, seeps through capillary walls into the interstitial space. Some fluid returns to the capillaries, but a significant amount of fluid, as well as white blood cells, proteins, fats, some toxins, and large particles of debris, are left behind, constituting the lymph, which must find another way back into the bloodstream.

The lymph collects in small, blindly ending vessels called lymphatics, which are found throughout all tissues of the body, except for the brain, striated muscles (the

muscles we can flex voluntarily, such as the biceps), eyes, nails, and hair. Along these lymphatic vessels are a large number of valves that keep the lymph moving in the proper direction. Veins also have valves, and for the same reason—to keep the blood flowing in one direction. Veins are helped in this task by blood pressure, which moves the blood back to the heart. Unlike veins, lymphatics get no help from the heart, but rely mostly on the muscles that massage the outside of the vessels to maintain flow. In addition, they are aided by other mechanisms. One mechanism, respiration, pulls the lymph along each time we inhale. Other mechanisms include the pressure of the pulses in the arteries, which pushes the lymph vessels that lie near them; changes in posture; and the passive compression of soft tissues.

Given the passive nature of lymphatic flow, you can see the importance of having good valves within your lymphatics. Without the valves, there would be little flow of fluid, and backed-up lymph would cause body parts to swell like balloons.

Notice that something as subtle as a pulse can affect lymphatic flow. Because lymphatic vessels are very thin, they are extremely sensitive to pressure, and are easily compressed. If the compression is rhythmical—like that created by natural movement or massage—lymph will flow. If the compression is constant, the vessel walls will remain closed, hampering flow. In the breast, which is an accessory skin gland, the lymphatics are close to the surface, and therefore are especially easy to compress.

We must mention another important structure in the lymphatic system. The lymphatics pass through successive lymph nodes, specialized glands found in clusters throughout the body. Lymph from the legs and parts of the genitals drain through the inguinal lymph nodes, which you can feel in the crease between your legs and belly. The

floor of the mouth contains nodes that filter lymph from the nose, lips, and teeth. Nodes are also located along the sides of the neck and behind the ears. The tonsils, in fact, contain one such mass of lymph nodes. And one of the largest cluster of nodes is in the armpit, where twenty to thirty nodes reside deep within the underarm and upper chest regions. These are the nodes we are interested in regarding breast cancer, since this cluster filters lymph from the breast, as well as from the arm and the upper part of the chest wall.

Because the lymph nodes filter out unwanted matter drained from the tissues by the lymphatics, they are central to the prevention of disease. In addition, the lymph nodes are the site of much white blood cell and antibody manufacture. These cells are key players in our immune system. When the lymph node detects foreign objects such as bacteria, toxins, or even cancer cells, it activates the synthesis of these immune system cells. Sometimes this process causes the lymph nodes to swell painfully, as can be the case with sore throats.

Besides the tasks of filtering tissue fluids and producing certain blood cells, the lymphatics perform a long-term function in the removal of fat-soluble toxins from the body. We accumulate fat-soluble toxins within our body fat. The breast is one area where this storage can occur. Yet our bodies are not static entities. They are in constant flux, replacing cells, proteins, fats, and carbohydrates. Just as over time, fat will exit a fat cell and enter the surrounding tissue, so, too, will fat-soluble toxins. The storage of toxins in body fat is harmful because it provides a reservoir of toxins that continually seep out into the surrounding tissue and do their damage.

Of course, tissue that is drained consistently will be cleansed of these toxins. But tissue that is congested and sluggishly drained may keep its toxin reservoir for longer

periods of time. Over the years, this may result in tissues having a relatively high toxin exposure, compared with that of freely draining tissue.

Breast Tissue and Drainage

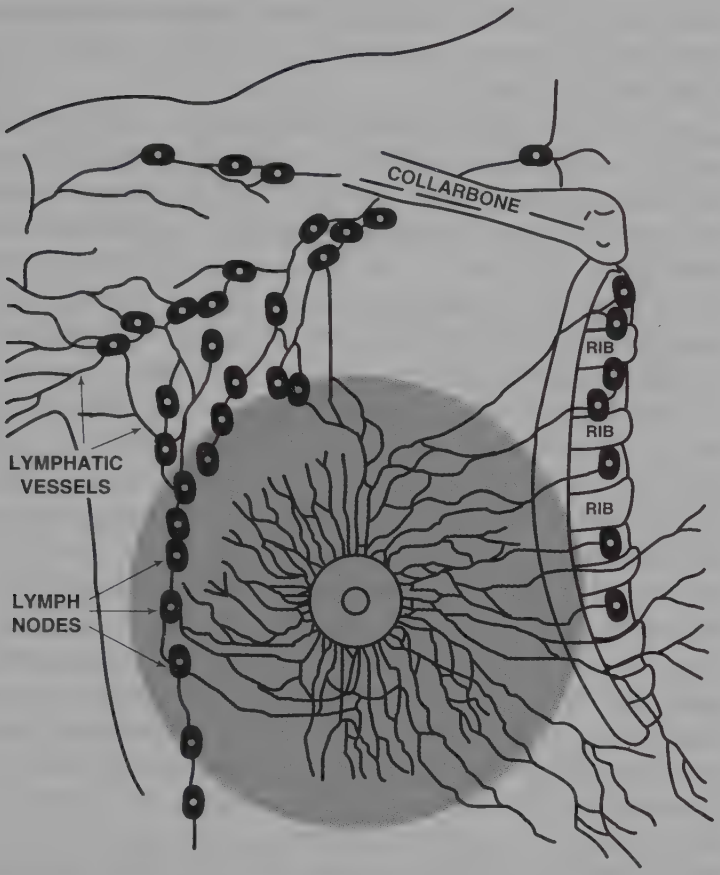
Over 85 percent of the lymph fluid flowing from the breast drains to the armpit, or axillary, lymph nodes. Most of the remaining fluid enters nodes alongside the breastbone. A small number of lymphatic vessels drain their fluid downward from the breast and into the liver. (See the figure on page 77.)

If anything were to constrict the flow of lymph from the breast, there would be poor drainage of the breast tissue. How severe must this constriction be to impede drainage? When it comes to lymph vessels, it doesn't take much force to affect flow. Slight pressure, such as soft tissue compression, can influence the flow within the vessels.

Now, what do you suppose a bra can do to the lymphatic flow?

Brassieres

Throughout recorded history, men have been interested in the shape of women, particularly that of their breasts, waists, and hips. An obsession with reshaping women into the "perfect" female figure has led to the creation of body-altering clothing that can be traced back through the millennia. Around 2500 B.C., Minoan women on the isle of Crete wore bralike garments that lifted their bare breasts out of their clothing. Cretans, too, developed the first known corset—a wide leather belt or "cinch girdle"—and the smallest waist in the history of costume. Throughout the centuries of Western history, corsets have employed steel, whalebone, cane, and wood to transform body shape.



Lymphatic Drainage of the Breast. In the above figure, the lines represent the lymphatic vessels, which carry the lymph throughout the body. The oval shapes that appear on some vessels represent the lymph nodes, which filter unwanted matter, including toxins, out of the lymph.

Breasts were sometimes pushed up to be accentuated, and at other times were flattened. Hips were emphasized or squeezed. And waists were sometimes constricted to the

point of skeletal deformity or organ abnormality. Women were the usual recipients of these portable torture racks, although fashion sometimes dictated that children and men wear them as well.

In the late 1700s, doctors, philosophers, and reformers unsuccessfully cried out for an end to tight lacing, which was seen as a health threat. By the late 1890s, corsets were full-bodied garments. Made of heavy cotton, these corsets were boned to produce the eighteen-inch wasp waist so essential to the fashionable hourglass silhouette. Corsets were being mass produced by that time, making them widely available. Groups combating corsets blossomed: the Pre-Raphaelites, with their uncorseted esthetic dress; the Rational Dress Movement; and the Healthy and Artistic Dress Union. The suffragette movement was influential in the better adaptation of corsets to female anatomy. Medical research also played a part in corset design, discovering that the corset required to achieve the infamous S-bend of the Gibson girl look distorted the spine.

Warnings to women about the health hazards posed by tight clothing in general—and by corsets in particular—continued into the twentieth century. And the warnings were much needed. In her book *Dress Reform*, Dr. Caroline Hastings explains how corseted women developed "diseases produced by this continuous pressure [from corsets]. For instance, the obstruction of pulmonary (lung) circulation may and does cause enlargement of the left ventricle of the heart, as well as congestion of the brain, liver, and kidneys."

However, fashions are difficult to change. Major reform had to wait until 1912, when Paul Poiret, the French fashion king, helped put an end to the armorlike corset. In its place he offered an elastic and light stockinette belt or girdle, complemented by the bust bodice. The bust bodice, of course, evolved into the bra.

Since their introduction to fashion, bras have under-

gone their own history of development. Every decade has placed its own emphasis on breasts. And through different combinations of padding and underwire support, bras have continually been adapted to reflect the fashions of the time. However, it is clear from its fashion history that the bra was not primarily made for women's comfort, but for men's pleasure. It is no surprise that bras are loaded with sexual innuendo, and that so many women equate bras with appearance.

This historical interpretation explains why many women now regard the bra as a comfortable article of clothing. Comfort is, after all, a relative term. Over the century, the bra has been compared, implicitly if not explicitly, with its predecessor, the corset. When compared with the corset, the bra is, of course, a godsend. Now, many women think of the bra as being both a comfortable garment and an appearance enhancer—a perfect combination of consumer attitudes for the fashion industry.

Needless to say, if you offered a bra to women from a culture that promotes bare breasts, it is doubtful that many of them would call the garment comfortable, although this is an experiment yet to be performed. Why do we make this inference? It follows from what bras do to the breast tissue.

The Effect of Bras on the Lymph System

Because of the way bras are constructed, the weight of the breasts is distributed between the shoulder straps, the side panels, the cups' underwire or cloth support, and the band between the cups. In addition to supporting the weight of the breasts, the bra lifts and shapes the breasts, which exerts extra pressure on the breast tissue.

When you consider the lymphatic drainage of the breasts, it seems plausible that the armpit lymph nodes and the lymphatics leading to them are constricted by a bra. The

drainage to the breastbone lymph nodes may also be hampered, particularly by bras that have underwires. Bras designed for comfort, ironically, usually have thicker side panels, reaching high up into the armpit and threatening all of this lymphatic drainage. Drainage to the liver from below the breast may also be stopped by the pressure of the cups against the breast. Shoulder straps, too, may potentially cut off drainage of those lymphatics that run from the top of the breast to the armpit. As mentioned in Chapter 2, shoulder straps have already been implicated in the constriction of nerves to the arms and hands. This requires greater pressure than does constriction of the lymphatics.

Consider the fact that the workplace has increasingly become a toxic, cancer-causing environment, as the new field of environmental health has shown. These carcinogens, combined with those we are exposed to at home, in our food and water, and in the air, enter our bodies and course through our arteries and capillaries. The toxins then enter all the tissues of the body. When conditions in the body are ideal, the lymphatics immediately get busy draining the tissues of toxin-filled fluid and the debris of damaged cells caused by the poisoning. The lymph nodes filter the lymph of contaminants, and the liver helps process the toxins for disposal from the body.

This is how the body works—except when we restrict the lymphatic flow and prevent the drainage of certain tissues. Many women who wear bras may be constricting their breast lymphatics and keeping toxins within their breast tissue for as long as eighteen to twenty-four hours daily. Meanwhile, the toxins are doing their best to transform normal cells into cancer cells.

A 1990 Japanese study, "Breast Form Changes Resulting From a Certain Brassiere," written by K. Ashizawa and published in the *Journal of Human Ergology*, provides an

important example of the effect of at least some bras on breasts. This study was designed to find ways to enlarge a woman's breasts. After three months of brassiere constraint, all the subjects experienced smaller underbust circumference, but enlarged chest circumference. The distance between the right and left nipples became wider, and the breasts tended to hang down. In other words, the breasts swelled under the influence of the bra. What could cause this swelling? The build-up of lymph. These breasts suffered from edema caused by the use of a certain bra.

Further, constriction of the lymphatics may cause toxins to become concentrated within the breast tissue. While the rest of the body slowly loses the toxins after exposure, the constricted breast tissue may maintain a higher level. When the next round of toxin exposure occurs, the breast tissue then gets a second dose on top of the first one. This leads to higher concentrations of toxins within the breasts than within nonconstricted tissues—a mechanism that may explain why women exposed to carcinogens more frequently develop cancer in their breasts, rather than in other organs, making breast cancer the primary cancer of women.

The theoretical model, then, is this: The immune system of the breast is being hampered in its job by the bra. Unable to drain the tissue, the immune system cannot filter out toxins and repair damage. For women who take off their bras at night, the process of cleansing and repair can finally begin. Yet each day the breasts are again assaulted with toxins and compromised lymphatic drainage. We are asking a lot of our immune system—tying its hands for eighteen hours a day and then assuming it will clean up the mess we made, only for us to make the same mess again the next day. Over the years, this chronic constriction of the breast tissue takes its toll. Overburdened, the immune system is beaten, and some breast cells become malignant.

While the tissue-cleansing role of lymphatics is al-

ready understood by modern medicine, this clothing-constriction model has never been studied, although the facts presented above make the validity of this model highly probable. From this we can postulate the possible damage to health that other constrictive garments may cause.

Other Constrictive Clothing

Certainly by now you may be wondering about other clothing and other cancers, for the same principles that apply to the constriction of lymphatic drainage may also explain cancers of the prostate, uterus, rectum and colon, testicles, ovaries, and bladder.

All of these organs except for the testicles are found in the pelvic cavity. The lymphatic drainage of both the pelvic organs and the testicles occurs via lymph nodes and lymphatics that begin below the level of the navel, and ultimately ascend the body along the back of the abdominal wall. Alongside these lymphatic vessels is a highway of major arteries and veins that lead to and from the heart.

Now, imagine a belt being drawn tightly around your waist. The lymphatics, due to their lack of internal pressure and their extremely thin, compressible walls, may react to this constriction by inhibiting the flow of lymph from the pelvis. Constriction from a belt might selectively affect one organ more than another because of the particular placement of the belt and the location of the lymphatic vessels and nodes in a given person. In general, however, a belt can possibly reduce lymphatic drainage of the pelvis. The only force countering the belt's constriction would be that of body movement, the pulse of the arteries in close proximity, and breathing. But considering the sedentary lifestyle of most Americans, our abdomens get little opportunity for the contraction that might otherwise assist lymphatic drainage. And few of us breathe deeply when sit-

ting, limiting the effectiveness of this important pump of the lymphatics.

When it comes to colon cancer, the greatest incidence is found in the parts of the colon that lie below the belt line, specifically in the sigmoid colon and the rectum. The mechanism by which lymphatic drainage may be inhibited by belts could help explain this phenomenon.

Are we saying that all cancers could be caused by clothing? Of course not! Tight clothing may simply serve as a handicap to our immune system because of its effect on the lymphatic system. In combination with other noxious stimuli and events, such as toxins, stress, poor diet, and so forth, the constriction of our bodies by clothing can set up a protracted process of degeneration, possibly leading to cancer.

In an April 1991 *USA Today* magazine article entitled "Dress for Health, Not Style," Dr. Leonard Morgan, assistant professor of family medicine at the University of Oklahoma Health Sciences Center, warns:

> Tight clothing is a definite year-round problem. Clothing should never be tight. Tight clothes interfere with blood circulation to the skin. Too-tight shirt collars and ties can interfere somewhat with blood flow to the brain. For people who already have arteriosclerosis, which is impeded blood flow to the brain, tight collars and ties can increase their risk of problems. Knee-hi hose and elasticized socks also can contribute to the development of varicose veins.

We suggest that this effect of clothing in general on the development of disease should be termed *Chronic Clothing Constriction*, or CCC, to characterize the long-term effect that tight clothing has on tissues, given its inhibition of lymphatic drainage. CCC is not a disease in itself, but is a

cultural behavior that may be involved in the creation of disease.

Tight Pants Syndrome is an offshoot of CCC. Citing research reported in the medical journal *Archives of Internal Medicine,* an article in the November 1993 *Men's Health* magazine declared that tight pants may be the cause of otherwise unexplainable stomach cramps, chest pain, and heartburn.

When you begin to view tight clothing as a possible health threat, it becomes clear that apparel can affect health through mechanisms other than lymphatic constriction. While these other mechanisms may not be directly related to cancer development, they do show that clothing can have a marked effect on body functions.

Besides the effect of tight clothing, we must also consider the effect of wearing certain tight-fitting items such as eyeglasses. As explained by Dr. Wrynn Smith in *A Profile of Health and Disease in America: Cancer,* "Another cited risk factor for cancer is trauma or repeated irritation. One of the most common sites of skin cancer is the bridge of the nose where eyeglasses continually rest." Notice that it is trauma or repeated irritation that is cited as the culprit, not exposure to ultraviolet radiation from the sun.

These statements, of course, do not solve the mystery of how eyeglasses can cause trauma, and how this trauma can lead to cancer. This mystery may be solved, though, by considering that eyeglasses squeeze the skin tissue with their weight, hampering the lymphatic drainage of that section of skin. Without proper drainage, the effects of toxins and ultraviolet radiation are more severe, as damaged cells and radiation products cannot be cleared from the area.

It is unfortunate that the medical profession has typically ignored the role of the lymphatics in the maintenance of health. Apparently the lymphatics are so small that they

are easily forgotten. Even *Gray's Anatomy*, a medical textbook, admits, "As these structures [lymphatic vessels] are not readily seen in his dissections, the student is apt to forget the study of lymphatic drainage." The fact that virtually nothing is written about the lymphatic system also makes it easy for doctors to forget about the lymphatic structures. The thymus, an organ of the lymphatic system, is hardly understood by medical science. The spleen, which is lumped in with the lymphatic system, is also poorly understood. All that the medical literature typically states about these organs is that they are involved with blood cells and the immune system.

This ignorance regarding the lymphatics has led to surgical procedures now considered inappropriate, such as the routine removal of tonsils. Instead of interpreting the swelling of tonsils as a sign that the body was doing its job, doctors felt it necessary to remove the tonsils altogether. About the only time the lymphatics are mentioned these days is in connection with cancer, especially breast cancer. They are not, however, seen as an important system in the prevention of cancer. Rather, lymph nodes are considered pathways for the spread of the disease. Surgeons study the nodes' locations so they can remove them when performing mastectomies.

Of course, lymph nodes can get diseased and damaged. After years of chronic constriction, the lymphatics and their nodes will suffer. Importantly, the valves in the lymphatics can become damaged by trauma and congestion. Once the valves are gone, forget the prospect of moving the lymph away from the tissues toward the heart. Tissues drained by these defective lymphatics swell and suffer from congestion.

In summary, then, breast cancer may be caused by the combined effects of toxins and bras on breasts. The plausible medical mechanism for this connection is that bras

focus and concentrate toxins within breast tissue by limiting lymphatic drainage.

THE NEXT STEP

By the time we had reached this point in our research, Soma and I were extremely excited. It is difficult to describe our feelings. In one sense, we were intellectually fascinated by what appeared to be a perfect example of a culturogenic disease. We felt like pioneers charting unexplored territory. Perhaps the deepest-felt emotion, though, was expectation. Imagine how significant this finding could be! Millions of women might be spared breast cancer by this easy-to-adopt lifestyle modification.

We were ready for the next step. We had to put our theory to the test.

5

Testing the Theory

Research is easy. *Good* research is difficult. I have seen so much research—in anthropology, medicine, biochemistry, sociology, psychology, and other academic fields—that is not worth the paper on which it is printed. We did not want to add ours to the pile.

To perform good research, you have to understand what you are looking for—your variables—and have controls in place for other variables that may confuse the picture. You also have to design the experiment to assess whether the variables in question are the ones you should have been looking at in the first place.

CHARTING THE TERRITORY

If a particular lifestyle predisposes women to breast cancer, we might be able to characterize women with breast cancer as a subculture—a smaller culture that exists within the larger culture. Since this particular lifestyle choice pertains to the wearing of bras, we would expect women with breast cancer and women without breast cancer to differ from each other in the way they wear their bras. And since lifestyles are related to attitudes and values, we would also expect that to accompany their different bra-wearing behavior, women in the breast cancer subculture

would have different attitudes and values about their bras and breasts.

On the other hand, it was possible that the lifestyle choices of women with breast cancer were no different from those of other women, in which case either our theory was wrong, or there were other variables we had ignored—variables that determine which women get breast cancer and which are spared. As we worked our way through the research design, we shared our theory with some friends and professionals who quickly caught our enthusiasm. Some of these people were women who had suffered from breast cancer. Several of them were very committed to our efforts to forge a new path in breast cancer research, and offered to assist us in financing the research. We loosely organized what is now the Institute for the Study of Culturogenic Disease, and decided that this would be the institute's first project. Our total operating budget was $20,000.

That doesn't sound like a whole lot of money, but we were elated. Our major expenses would be air travel, lodging, and food. All the work could be performed by trained and supervised volunteers.

As we filled in the details of our research plan, we wondered how many surprises lay ahead. The study of women's attitudes and behaviors toward their breasts and bras was and is new territory as a subject of science. In some respects, this subject could not have been studied in American culture without our liberalized sexual attitudes. Until recently, it would not have been considered appropriate to ask a strange woman about her bra-wearing behavior or her attitudes toward her bra and breasts. But times have changed.

AIDS has brought the topics of penises, sex, safe sex, oral sex, anal sex, condoms, masturbation, and other previously taboo subjects into every American's home

through the media. Still, discussing bras and breasts is not exactly a piece of cake. Nevertheless, we felt that our excursion into the private lives of women would elicit new information about something that affects virtually every American woman, but probably has never before been discussed or even considered.

When a woman stands alone in front of a mirror, she looks at more than her physical features. She sees herself as *female*, with all the cultural trappings that come with that classification. She assesses whether her face is the right shape; whether her nose is too large or small, too flat or pointed; whether her hair is the right length. She looks at her body, determining whether she is too fat, too flabby, too tall, or too short. And she looks at her breasts and judges their shape, size, and tone.

Of course, men do the same thing with their bodies, using different standards and perhaps different body parts. We all do this to ourselves. Some of us are more preoccupied with such self-assessment than others, but we all seem caught up in comparing ourselves with some standard of physical beauty.

Who sets this standard? Nobody seems to know for certain. I have watched teen-age girls compare themselves with movie and television stars and use fashion magazines as textbooks on personal appearance. "What makes you think that these styles are beautiful?" I have asked some of these girls on occasion. Typically, the response is a blank stare that seems to say, "Everybody knows this is beautiful. It's the way people are supposed to look."

Our culture conditions us without our being aware of the process. Few people stop to ask who is setting the fashion and what makes a popular fashion acceptable.

Of course, breasts are in fashion. In Western civilizations, they have been for centuries. One hundred years ago, fashion dictated that women constrict their bodies

with corsets to the point of disease. Disease was an unfortunate side effect of being beautiful—if a disfigured woman shaped like an hourglass is one's idea of beauty.

But women are at least now able to talk about such things. And as anthropologists, we talk to people as a primary form of investigation. In developing a questionnaire, we tried to allow for candor in the responses. Some questions can be leading, resulting in biased responses. It was therefore crucial that we develop the right questions.

In our study, we were trying to distinguish between groups of women on the basis of breast cancer incidence, and to see whether this distinction was associated with specific behaviors and attitudes toward bras and breasts. If bra-wearing behavior was indeed associated with breast cancer, we would have to make sure there were no other factors that could explain the connection.

We felt no need to repeat other researchers' work by examining all the known risk factors in our questionnaire. Besides, as risk factors, they are not causally related to breast cancer but are merely predictive of the disease. The connection of bras to breast cancer, however, could be more than a correlation. Given the lymphatic mechanism we described, the relationship could be causal.

In other words, we did not have to ask whether, for example, the interviewee had a close relative with breast cancer. We already know that more women with breast cancer have this history than do women without breast cancer. Since this has nothing to do with the wearing of bras or the lifestyle surrounding that behavior, we did not need to ask about it.

How can significant risk factors be viewed as unnecessary to this study? This is an important question, and to answer it, we must examine the nature of research into the cause of disease.

The purpose of this type of research is to discover signifi-

cant relationships between a disease and aspects of life that relate to that disease. We must look for biological, environmental, and cultural factors, since we must understand human nature from each of these perspectives to have a complete picture. However, as you might guess, it would be impossible to conduct any research project if all the possible variables of human biology, environment, and culture had to be considered at the same time. To surmount this problem, a research project is designed to examine as few variables as possible, hoping that other variables can be ignored for that study. Here is where problems can occur, since the whole of human nature cannot be easily divided into relevant and irrelevant features with regard to a particular disease—especially a disease that is still largely a mystery.

The art of science lies in recognizing the relevant connections between various aspects of human nature, and in seeing the whole through an examination of many parts. In practice, researchers study a feature of human nature—the variable—along with other features, or variables, that may relate to it. Variables that have no significant connection can be ignored. Because these other variables are independent of the one being studied, they have no direct bearing on the study.

In the bulk of breast cancer research, the perspective of human nature studied is biochemistry focused. As mentioned earlier, estrogen has been traditionally considered a potential breast cancer factor. Because estrogen, being a hormone, is connected to so many bodily functions, it must be considered in virtually every biochemical study of breast cancer. As a result, even studies of dietary factors consider estrogen levels. Dietary fiber, for example, has been thought to reduce breast cancer incidence through an effect on estrogen excretion in the intestines. Many other breast cancer factors have also been thought to operate via

a hormonal mechanism—a mechanism as yet not fully understood—that might involve estrogen. It is clear from the literature that any study that may involve a biochemical mechanism for breast cancer must consider all biochemistry-associated risk factors as potentially relevant variables, since the fundamental mechanism(s) underlying the risk factors may have biochemical connections. Hence, age at menarche, age at menopause, use of oral contraceptives, and other risk factors that may be connected to estrogen levels are considered in all good biochemical studies of breast cancer. On the other hand, known risk factors that are not biochemistry oriented—such as income, country of birth, and profession—are ignored.

However, not all breast cancer studies are biochemistry focused, and the variables that must be considered along with the studied variable must be of the same type. Biochemical studies consider biochemistry-related variables; cultural studies consider cultural variables. Hence, a study reported in the *Journal of the National Cancer Institute*—P. Buell's "Changing Incidence of Breast Cancer in Japanese-American Women"—considered the demographic variables of place of birth and age at immigration. Biochemical risk factors were ignored, since they have no relevance to emigration patterns—even though they do relate to breast cancer.

Our study was to be a cultural analysis of attitudes and behaviors toward breasts and bras. Risk factors not significant in their effect on attitudes and behaviors towards breasts and bras—such as age at menopause, use of oral contraceptives, and number of children—could be ignored. However, we did have to consider some factors that happen also to be known breast cancer risk factors, as these factors potentially relate to attitudes and behaviors toward bras and breasts. Age, breastfeeding experience, and income all seemed relevant to our study, since different age and economic groups

may have different attitudes and behaviors regarding breasts and bras, and since breastfeeding reflects a woman's attitude toward her breasts. We also had to ask how long a bra was worn daily, what the subject's attitudes were regarding her appearance, and so forth. We even had to be aware of the order of the questions. One question can bias the interviewee in a way that affects her responses to later questions.

GATHERING THE DATA

The Bra and Breast Cancer (BBC) Study began in May 1991, and ended in November 1993. The research took us to five major cities across the United States: San Francisco, Denver, Phoenix, Dallas, and New York City. In each city, we interviewed approximately 400 women, for a total of 2,056, who had been diagnosed with breast cancer. In each city, we also interviewed approximately 500 women, for a total of 2,674, who had no known diagnosis of breast cancer. The interview style was conversational, and any comments that women made in response to the questions were also recorded and analyzed.

Soma was the principal fieldwork investigator. We felt that a woman should ask the questions, since a male interviewer would make the women uncomfortable. On occasion, Soma recruited the help of female volunteers, all of whom received instructions regarding how the questions should be asked, and how the responses should be recorded. Soma tried to match the ages of interviewer and interviewee as much as possible to reduce communication barriers. Our young volunteers were college students. Our older volunteers were found through senior centers.

One methodological challenge we encountered in the study was that women with breast cancer were being asked solely about their past attitudes and behaviors,

while those without cancer were being questioned about current and past behavior. We assumed that breast cancer diagnosis and treatment would alter a woman's attitudes and behaviors toward her breasts. Since our focus was on prevention, in our interviews, we emphasized that we wanted to know how the women had felt and acted toward their breasts before their diagnosis.

Frequently, we were able to obtain confirmation of the women's responses from their spouses, who were present during about 50 percent of the interviews. In virtually no case did we get any contradiction of the woman's response. We therefore felt confident that we were successfully eliciting past attitudes and behaviors from these women.

It is important to realize that the women who had received breast cancer diagnoses were under active treatment for breast cancer. Their diagnoses were recent enough to allow them to remember patterns of bra usage and the effect of this usage on their breasts. Indeed, not one woman questioned responded, "I don't remember." In addition, it is vital to keep in mind that, according to the American Cancer Society, breast cancer is a process that can begin up to twenty years before the disease is detected and diagnosed. Our purpose was to find attitudes and behaviors that dispose a woman to breast cancer. If we assume that it can take years for these lifestyle characteristics to exact their price on a woman's breasts, it becomes clear that it is past behavior that must be studied in the case of women with breast cancer. In the case of those without breast cancer, their past and present are still writing the story of their future.

This brings us to another point. The women we questioned from the general population were not certified forever free from cancer. According to national statistics, almost 13 percent of them will go on to develop breast cancer. Some of them, no doubt, had undetected tumors growing in their breasts at the time of the study. Conse-

quently, we should not consider all their behaviors and attitudes as examples of how breast cancer can be prevented. While the majority of these women will be spared breast cancer, the results from this population will reflect some of the lifestyles of people on the road to cancer. This makes a statistical analysis of the study's results highly problematic, since such an analysis would require "pure" groups, with no crossover, particularly of an uncertain number. Fortunately, we do not need a complex statistical analysis to understand the findings.

To avoid the confusion inherent in questioning women of different ethnic backgrounds, we chose to limit the BBC Study to Caucasian women. Worldwide, these women have the highest incidence of breast cancer. While the rate of occurrence differs among races and cultures, we expected that any evidence of bras leading to breast cancer is significant for all women who wear bras, regardless of racial or cultural background.

Finally, we were sensitive to the fact that, despite our more liberalized society, questions about bras and breasts are still somewhat taboo. Therefore, women with cancer might be either more or less comfortable discussing this topic than would women from the general population. This difference could theoretically skew the results of the questionnaire. However, we found that the same percentage of women with cancer and from the general population—about 30 percent—were willing to talk with us about these issues. This suggests that the subculture of women with cancer and the general population of women did not react differently to the questionnaire, although this variable certainly should be considered in any future uses of the questionnaire.

With questionnaires in hand, Soma questioned women outside hospitals, clinics, doctor offices, and anywhere else she could find women with breast cancer. Many times, she

was given a referral from one cancer patient to another, and would complete the questionnaire over the phone. Women without breast cancer were also good sources of referrals to women with the disease. It was amazing to find how many people know someone with breast cancer.

When the data was finally collected, it was my job to make sense out of it. The results were astounding—and beyond our wildest imagination.

6

Taking It to the Street

Our objective had taken over our lives. The work of poring through mountains of research and interviewing over 4,500 women, about half of whom had breast cancer, was an all-consuming task.

It is the duty of any researcher to remain impartial throughout the data-gathering phase, as well as during the interpretation of results. I had gained practice in this art of self-control during my years of working in biochemistry research labs, sitting in front of large machines and looking at test results as they flashed on a screen or were sketched on paper. If you care about the results, you anxiously await the data and chart it, hoping to substantiate your theory and thereby make the experiment a success.

With experience—and wisdom—the researcher comes to realize that all experiments are successful as long as they provide some meaningful information. The results do not have to match what was expected for a study to be termed a success. In fact, you sometimes learn more from surprise findings than you do from expected ones. Surprises let you

know that you have more to learn, and can point you in a more profitable direction.

I assumed that the Bra and Breast Cancer (BBC) Study would yield some surprises—and it did, as you shall see. But as you shall also see, our theory passed the test. And with flying colors!

THE FINDINGS

Let us present the test findings to you one question at a time. The original sequence of questions was designed to elicit the least biased response. (See page 99 for the original sequence of questions.) However, to analyze the responses properly, we have divided them into three categories: background information, attitudes, and behavior. It is most instructive to review the results in light of these categories.

Background Information

As stated in earlier chapters, human beings must be understood from biological, environmental, and cultural perspectives if any assessment of disease is to be complete. As we explored women's attitudes and behaviors towards breasts and bras, we needed to address basic biological, environmental, and cultural variables that help define these women. Of course, biologically, we had to assess whether or not the woman had been diagnosed with breast cancer in her lifetime. This assessment, which was essential for placing the woman in either the standard or cancer group, was made prior to the interview, and so does not appear on the questionnaire. Another variable that defines a woman biologically is age. An environmental issue of great concern is exposure to toxins, since this may predispose a woman to breast cancer. Finally, income level helps

The Questionnaire

1. What is your age?
2. Do you wear a bra? Have you always worn (or not worn) a bra? During what ages in your life did you not wear a bra?
3. Are you comfortable with the size and shape of your breasts without a bra?
4. Do you select bras to shape or accentuate your breasts?
5. Other than price, what is the most important feature you look for when buying a bra?
6. Does your bra occasionally seem tight or uncomfortable?
7. Does your bra ever make red marks on your skin or cause irritations?
8. How long do you wear your bra each day on the average?
9. Do you wear a bra or breast-supporting garment to sleep?
10. Have you breastfed?
11. Have you ever had an occupation that exposed you to chemical fumes, radiation, or other toxins?
12. Would you place yourself or your family in a low income, medium income, or high income bracket?

define a cultural variable that frequently influences a woman's lifestyle choices.

■ ***What is your age?***

The ages of the women ranged from 30 to 79, with the majority falling between 40 and 70. The distribution of ages in both groups did not reflect any national averages for breast cancer or for women in general. This is no surprise or problem, since we made no attempt and felt no need to get such a distribution for this type of study. However, it was important to determine if there was any relationship between age and lifestyle practices. And here we found some interesting results.

Women of different ages in both groups did not significantly differ from one another in their attitudes or behavior toward their breasts. Women over seventy tended to put slightly less lifestyle emphasis on their breasts, although this was more the case in the standard group than in the cancer group. Apart from this finding, we were able to treat all women within each group the same, regardless of age.

It is interesting to note that many older women stated that at the time of the study, they felt the same way about themselves as they had when they were younger. Personal identity, particularly sexual identity, seems relatively unchanged throughout time. Some women made statements such as, "I am sixty-eight but feel forty," and, "You're as old as you feel."

Frankly, we were surprised by this finding. Knowing that age is a risk factor for breast cancer, we expected that older women and younger women might have different attitudes or behaviors regarding their breasts. But when you consider that cancers can take many years to develop, it seems that the cause of the higher breast cancer incidence among older women may simply be a longer exposure to

toxins, coupled with years of other unhealthful lifestyle practices and attitudes.

- ***Would you place yourself or your family in a low income, medium income, or high income bracket?***

  Results: Standard group: 37% low; 55% medium; 8% high
  Cancer group: 30% low; 60% medium; 10% high

In both the standard group and the cancer group, most of the women fell into the medium income bracket. A greater percentage of women in the high income group were found in the cancer group. This is consistent with the finding that high income, which is related to high socio-economic status, is a breast cancer risk factor.

- ***Have you ever had an occupation that exposed you to chemical fumes, radiation, or other toxins?***

This was the only question that the women had difficulty answering. Most women had no idea of the toxins in their workplace, and their answers to this question reflected more their ignorance about toxin exposure than their actual exposure. In some cases a woman was clear about her toxin exposure at work, and this was more the case in the cancer group than the standard group. The diagnosis of cancer may have stimulated some women to reflect on their history of toxin exposure. However, the number of clear responses was too small to permit generalizations.

Attitudes

The next group of questions concerned attitudinal responses. Attitude is a state of mind and feelings. Our

questions were designed to explore these women's feelings about bras and breasts.

■ ***Are you comfortable with the size and shape of your breasts without a bra?***

Results: Standard group: 18% yes
Cancer group: 5% yes

In cultures in which a woman's breasts are viewed primarily as a means of nourishing infants, a woman's contentment with her breasts hinges on practical issues. Do her breasts provide enough milk? Do they get in the way of working? Such women, and their men, give breasts little attention. And these societies have extremely low rates of breast cancer. In fact, according to C. Muir's *Cancer on Five Continents,* some of the lowest breast cancer incidence rates in the world are found among the women of non-Jewish Israel; Singapore, Malay; rural Poland; and Bombay, India. In our own country, low rates are found among American Indians in New Mexico. What do these groups have in common? In their cultures, the primary form of dress does not include the bra.

In our society, breasts are, in part, sex objects for men, and men primarily have the greatest social power. The practicality of attractive cleavage in our society means that a woman may be more appealing to men for favors, admiration, status, or companionship. For a woman lucky enough to have a pinup figure, her organs of lactation have been transformed into door and eye openers. Those with less than pinup outlines might prefer minimizing the focus on their breasts. But society will not allow that. Comparisons are made and breasts are judged, regardless of a woman's personal attitudes. Women are forced to assess their breasts and fall into a breast-defined pecking order relationship with other women. They may love their

breasts or hate them, but they will come to regard their breasts as important in regard to friends, lovers, and even the attitudes of strangers.

In our survey, the overwhelming majority of women were uncomfortable with the appearance of their breasts. Those in the cancer group were even more uncomfortable than those in the standard group. Remember that this referred to the attitude they had *before* getting cancer. Only 5 percent of the cancer group women stated that they had felt good about their breast size and shape. The standard group was also mostly displeased with their breasts' appearance, but 18 percent said they were comfortable. It is interesting to note that almost all the women in both groups had an opinion about their breasts. Positive sentiments about their breasts were typically stated with some modesty, with a response such as, "I feel fine about my figure." On the other hand, women who disliked their breasts were very clear in their feelings, with some women saying, "I look terrible without a bra!"

It is no surprise that these women were mostly displeased with their breast appearance. After all, images of "perfect" breasts permeate the minds of men and women daily through advertisements, television, and movies. Fashion does not cater to the bodies of women, but demands that women conform to the dictates of fashion designers. Designers have a distinct preconception of how the ideal breast should look. Few women feel that they fit the image.

Many women who fail to look like models eternally try to do so. Women have been conditioned to believe that they are lacking in some essential quality if their breasts do not curve, arch, and point correctly. That the standard of beautiful breasts is clearly subjective makes no difference to most women. Cultural values set the standards for the masses. Those who live within a culture are subjected

to those standards, regardless of reasonability. (We will further address the cultural values of breasts and bras in the following chapter.)

Incidentally, standards of breast size do change over time. Sometimes small breasts are in fashion, sometimes large ones. The challenge for women is to meet the ideal, whatever it may be at any given moment. And ideals are characteristically difficult, if not impossible, to reach. This, of course, keeps women uncomfortable about themselves and unhappy with their breasts—and forever turning to the fashion industry for a means of making their breasts conform to current standards. They even go to doctors to help them conform to social beauty standards. About 2 million women in the United States have augmented their breasts with implants solely for cosmetic reasons.

■ ***Do you select bras to shape or accentuate your breasts?***

Results: Standard group: 74% yes
Cancer group: 87% yes

The standard for beautiful breasts has clearly made many women uncomfortable with their own bodies. What do they do? They buy bras to change the appearance of their breasts.

We are starting to see a pattern here. Women in the cancer group were more concerned about breast appearance than were women in the standard group, and more than other women, they selected bras to change the look of their breasts. Could this attitude be related to breast cancer? This cannot be inferred until the rest of the data is revealed. But we should start to look for a continuation of this attitudinal pattern, which we will call a *fashion focus*.

■ ***Other than price, what is the most important feature you look for when buying a bra?***

Results: Standard group: 30% appearance;
51% comfort; 19% both
Cancer group: 62% appearance;
25% comfort; 13% both

This question was used to verify the woman's attitude toward bras. When we designed the questionnaire, we were concerned that some women would not admit that they were interested in appearance, as such an admission might be perceived as revealing their insecurities about their breasts. To surmount this possible problem, when the response to this question included both appearance and comfort, the interviewer was instructed to ask, "Which is more important to you?" This follow-up question allowed us to determine the woman's primary consideration when buying bras. If the response was still "both," we recorded it as such. Otherwise, we recorded the response as either "comfort" or "appearance."

What do bras represent to women? Some women—especially large-breasted women—use bras for comfort. A bra can distribute the weight of large breasts by means of the shoulder straps and side bands. Here the bra would function as a harness. Responses such as, "I look for a good fit" and "I look for a bra that supports my breasts" we grouped together as comfort concerns.

But small-breasted women clearly have no need for a breast harness. And, let's face it, the concept of a "breast harness" would not sell. It makes a bra sound more like a prosthesis than a fashion garment. Clearly, many women select bras for fashion rather than function. Responses such as, "I look for a bra that makes me look sexy" and "I look for a bra that makes my clothes fit better" we grouped as appearance concerns.

Women in both groups were very aware of the need for bra comfort, although the standard group was more aware of this need for comfort than was the cancer group. Generally speaking, a concern for comfort makes sense when choosing a potentially uncomfortable garment. Of course, any garment can cause discomfort, but you would expect comfort to be of greatest concern in the selection of apparel that has the greatest potential for causing discomfort. Bras, other underwear, and shoes fit more tightly than other garments, and therefore have the greatest potential for causing discomfort. This comfort response, then, clearly shows that women are aware that bras can be uncomfortable.

Fashion, however, often prevails over discomfort. In the cancer group especially, appearing beautiful, or at least socially acceptable, was often more important than being comfortable. Or perhaps we should conclude that the discomfort of a poor appearance is greater than the discomfort of a tight bra. Keep this in mind as another aspect of the fashion-focused woman.

What does this information tell us? In this study, women with breast cancer were two times as likely to value appearance when selecting a bra than was the standard group of women. In addition, women from the cancer group were half as likely to consider comfort than were those in the standard group. The cancer-group women often selected bras more for style than fit. Fashion focus, then, unfolds further, suggesting that women with this attitude willingly sacrifice physical comfort in response to some societally imposed standard of beauty.

How does this relate to breast cancer? When breasts are squeezed by a bra, the woman usually receives some negative feedback in the form of red marks, skin irritations, and perhaps even pain. But for the woman with a fashion focus, these warning signs seem largely ignored. Their body-sense is silenced by the self-assurance that

they are successfully looking the part of a fashionable or sexy woman.

Let's test this impression. The next question will prove revealing.

■ ***Does your bra occasionally feel tight or uncomfortable?***

Results:	Standard group:	28% rarely;
		55% sometimes;
		17% always
	Cancer group:	48% rarely;
		34% sometimes;
		18% always

Since many women claimed that comfort was important to them, you would assume they have comfortable bras. On the other hand, perhaps women think about comfort because they rarely find it.

To harness the breasts and keep them pointing up and out requires pressure from the bra. Pressure is never comfortable, especially for long periods of time. Perhaps the promises of bra manufacturers that their products are both beautifying and comfortable are ideals or empty promises rather than a reality.

According to our results, and this is quite interesting, 48 percent of the cancer group reported rarely having discomfort from their bras. At the same time, 28 percent of the standard group asserted that their bras rarely caused discomfort. The majority of women in the standard group, 55 percent, said that they sometimes felt discomfort from their bras, compared with 34 percent of the cancer group. About the same percentage of women in each group, approximately 18 percent, said that they always had discomfort from their bras.

Realize that this question measured subjective impres-

sions regarding bra comfort, and that comfort is a relative concept, close in meaning to "acceptable." Many of us have learned to be comfortable with experiences that are not necessarily pleasant. We learn to accept those disagreeable events and experiences that we believe we cannot avoid. Take, for example, rush-hour traffic, having a dentist work on your teeth, or paying the phone bill. Although these are not intrinsically pleasant events, somehow we learn to be comfortable with them.

Part of our mechanism for associating comfort with an unpleasant stimulus is to focus on a pleasant stimulus. Rush-hour discomfort is diminished by the pleasure of music on the radio or the anticipation of getting where you want to go. We learn to be comfortable with a dentist's drill whirring in our mouths by thinking about a nicer smile or less oral pain. And who can think only of price when you pick up your phone to reach out and touch someone—unless it's your teen-age children who are making all those long-distance calls.

Women with a fashion focus may report less discomfort with their bras because, being interested in looks more than comfort, they have already made a subconscious trade-off. If comfort is a secondary concern, women will not think about bra discomfort. They will focus more on the reason for wearing the bra in the first place, which will be measured more in terms of the reaction from others—particularly men—than in terms of the reaction from their breasts.

On the other hand, it would be incorrect to conclude that all women who reported feeling comfortable were denying their pain, or were insensitive to the feelings of their breasts. Women who state that their bras are comfortable may simply wear looser bras. Another possibility is that physiologically, these women have a higher threshold of pain and discomfort. Some women, too, may have learned to feel comfortable in a bra after years of bra

wearing, just as some women learn to feel comfortable in tight, pointed, high-heeled shoes. It is important to note that in many instances, our society raises our threshold of discomfort. Consider, for example, a baby who keeps kicking off his shoes because he finds them so uncomfortable. His mother and father, however, probably wear shoes for many hours at a time without feeling discomfort. The constant wearing of shoes has raised their threshold of discomfort to a point where they can wear most shoes without experiencing any unpleasant sensations.

If Soma had been asked about the comfort of her bra before she discovered her breast lump, she would have reported a feeling of comfort. Like most American women, Soma had worn a bra daily since adolescence. Her breasts had never known the sensation of being bra-free. Here we see a problem inherent in subjective appraisals of comfort. Comfort is, to a degree, a relative term. When we asked women if their bras felt comfortable, an appropriate response might have been, "Comfortable compared with what?" If we are assessing the comfort of bras compared with that of being braless, few American women would be able to make this comparison. In Soma's case, once she became bra-free, she was able to compare the feeling of wearing a bra with that of being braless. She now realizes that she had been uncomfortable in her bra.

What this means is that subjective appraisals of comfort can change, and are not a terribly reliable measure of how a bra may be constricting the breast tissue. Is there a more objective way to determine if a woman is being damaged by her bra? By examining a woman's behaviors, we can gain further insight into the effects of bra wearing.

Behaviors

Attitudes are in people's heads; behaviors are what people

do. They reflect the way people conduct their lives on a daily basis. And behaviors are easier to measure than attitudes, since they create events we can see.

■ ***Does your bra ever make red marks on your skin or cause irritations?***

Results:	Standard group:	25% rarely;
		52% sometimes;
		23% always
	Cancer group:	14% rarely;
		46% sometimes;
		40% always

The purpose of this question was to create some physical appraisal of a bra's effect on breast tissue. Tight, constricting bras leave red marks, and tend to create irritations and other signs of damage. As just discussed, whether or not this causes a woman to experience discomfort or pain can depend on many things. The last question showed that most women in both groups found bras uncomfortable at least some of the time. With this question, we tried to discover whether subjective reports of discomfort corresponded to objective signs of breast irritation. Our assumption was that breasts which show signs of irritation will also feel uncomfortable. Did the results support this assumption?

Notice that only 14 percent of the cancer group reported that red marks and irritations occurred rarely. On the other hand, 86 percent reported having signs of irritation from their bras sometimes or always. Yet, from the previous question we saw that 48 percent of the women in this group reported rare bra discomfort. What does this mean? How could about half these women say they were not uncomfortable, yet almost 90 percent of them have red marks or irritation around their shoulders, chests, and breasts at least some of the time?

Further, almost half the women in the cancer group

reported always having red marks or irritations from their bras. At the same time, only 18 percent reported always being uncomfortable. Could this mean that red marks and irritations were not uncomfortable to them?

Let's look at the standard group results. These women reported physical signs of irritation from their bras in the same proportions that they reported subjective impressions of discomfort. That is, 28 percent said bras rarely felt uncomfortable, and 25 percent said they rarely found irritation or marks from wearing a bra. But 55 percent said bras were sometimes uncomfortable, and 52 percent reported sometimes having physical signs of discomfort. And 17 percent said they always felt uncomfortable from bras, while 23 percent reported always having physical signs of irritation from them. When we checked which women gave which results, there was a good correlation between responses for these two questions. That is, women who sometimes felt discomfort usually said they sometimes had red marks; those who rarely felt discomfort rarely had red marks, and so forth.

This difference between the two groups' responses suggests that women in the cancer group, for whatever reason, tended to feel less discomfort from their bras than did women in the standard group, despite more frequent reports of objective signs of breast irritation. What these women seem to have experienced, then, were physical signs of irritation without the subjective feelings of discomfort that one would expect to result from these irritations. How can we explain this paradox? In part, these responses may have been the result of the higher threshold of discomfort discussed earlier in the chapter. Further, we may be seeing another aspect of the fashion focus, which was characteristic of many women in the cancer group. Women who believe that bras are necessary for beauty may subordinate their body-sense to their fashion sense.

Red marks and irritations left by bras may not feel good, but a fashion-focused woman may believe that beauty is worth the price.

What this does to a woman's breasts, however, is not beautiful. If you are not listening to your breasts, you are apt to abuse them. Compressing lymphatic drainage with a tight bra could be a mechanism for developing cancer. The more insensitive a woman is to her breasts, the more likely she will ignore the messages from her body saying, "Stop constricting me!" Red marks, irritations, and swollen tissue are signs that the breast is in trouble. Ignoring those signs is like turning off a smoke alarm while the house is on fire. And once a woman is insensitive to her own body, she is apt to do other damaging behaviors, as the next question illustrates.

■ ***How long do you wear your bra each day on the average?***

Results:	Standard group:	20% less than 12 hours daily 80% more than 12 hours daily
	Cancer group:	1% less than 12 hours daily 99% more than 12 hours daily

Here, we were trying to assess the amount of time a woman feels it necessary to support or enhance the appearance of her breasts. Of course, some women may not wear a bra for deliberate support or beauty enhancement, but simply because it is the norm. Regardless of the motivation, from our hypothesis we would expect the women with breast cancer to have possibly compromised their lymphatic drainage more severely by wearing bras for longer periods of time.

When asking women this question, we offered two re-

sponse choices: a bra is worn less than twelve hours daily, or a bra is worn more than twelve hours daily. Obviously this question pertained only to women who wore bras, and not to the entire sample of women.

How would you expect women with a fashion focus to respond to this question? Would women who feel the need to wear bras for beauty or as a social norm shed these undergarments at the earliest possible moment during the day?

The response from the cancer group was that 99 percent wore bras more than twelve hours daily, compared with the 80-percent response of the standard group. This certainly is consistent with the anticipated results.

Women with a fashion focus would identify their breasts with their appearance. Their spouses may even be attracted to them in large part because of their appearance. Just as some women feel the need to wear makeup all day to look their best, women who believe that their breasts need the assistance of bras to look their finest will wear them as long as they are being observed, even if the observers are their own family members. In fact, several women in both groups reported that their husbands liked to see them in sexy clothes in the evening. The women making these comments all wore their bras at least until bedtime.

Single women, on the other hand, are spared the need to worry about their breast appearance at home. But these women may have social lives that keep them on their toes, from a fashion and appearance point of view. "You never know who may stop by," one woman explained.

Besides these social concerns, women with a fashion focus may identify with their clothing-enhanced appearance. When your self-image and self-esteem are partly related to your breast shape, you are apt to keep a bra on to feel your best. Most people, for example, probably comb or brush their hair regardless of whether they are in the company of others.

The mirrors we all glance at allow us to assess ourselves. We all want to feel good about the way we look. When a woman places a great deal of psychological emphasis on her breasts, and she feels that they are unsightly without the shaping effect of a bra, she is likely to continue wearing her bra. As one woman aptly put it, "I can't stand the way I look without a bra on." Another woman summed up her reason for wearing a bra in the evening by saying, "My tits will sag all the way to my navel without a bra. It makes me feel like an old bag." And another woman explained, "I do my best to look as young as I can."

There is an important point to make here regarding the cancer group and a fashion focus. Not all women in the cancer group had a fashion focus. Many women had simply become accustomed to wearing bras. Admittedly, there were some women who felt that their breasts were large and uncomfortable. Women sometimes perspire under their breasts, and the skin of each breast can get irritated as the breasts rub against other skin or each other. Also, large-breasted women can develop postural difficulties and back problems because of an unequal distribution of weight between anterior and posterior, causing them to lean forward. For these women, comfort is a real issue, and they turn to bras for an answer. One woman who wears a bra until bedtime told us, "They [her breasts] just get in the way."

But comfort is a subjective issue. Bra manufacturers advertise that their products can assist in comfort, and many women believe the ads. That is the power of advertising. Regardless of the truth of the claims, bras may be worn to satisfy a women's need for comfort. This comfort may be psychological or physical, but once women get used to wearing bras for whatever reason, they may continue wearing them over long periods of the day.

Despite the motivation, these women may pay a price regarding the health of their breast tissue. All our behaviors

are trade-offs. We exchange some physical and psychological discomforts for others. When it comes to bras, the discomfort caused by limited lymphatic drainage of the breasts may not feel severe enough—at the time—to outweigh other considerations. But time moves on, and disease often creeps up on us step by step, catching up to us when we least expect it.

Therefore, as far as breast cancer is concerned, it does not really matter whether the women in the cancer group all had a fashion focus or not. What really matters is their behaviors. On the other hand, it is helpful to see a pattern of attitudes associated with certain destructive behaviors so that women who do not have breast cancer can observe the pitfalls—and, hopefully, avoid them.

Clearly, in comparison with the standard group, the cancer group had a larger percentage of women who wore bras for more than twelve hours a day. Whether because of a fashion focus or a variable completely unrelated to appearance, they were behaving in a manner that may be associated with breast cancer.

When we checked the details of each woman's response, we discovered an important and instructive distinction between the two groups of women. Of the 1 percent of women in the cancer group who removed their bras before twelve hours of wearing time, almost all reported having red marks sometimes or always, with almost none reporting rare irritation. In fact, most of these women reported *always* having red marks. This means that despite the fact that they wore their bras for shorter periods of time than other women, they experienced signs of possible breast irritation as a result of wearing bras. Some of these women even stated that it was feelings of discomfort that led them to remove their bras early in the day. "I couldn't wait to get home [from work] to take off my bra," one woman explained.

The women in the standard group, however, had a

different story to tell. Of those 20 percent who took off their bras after less than twelve hours of wearing time, most reported no red marks or irritations.

Why would the women in the cancer group who removed their bras after less than twelve hours of wearing time have a greater tendency to experience physical signs of possible bra irritation than had women in the standard group with the same behavior? It may be that the women in the cancer group wore bras that were too tight, or wore a type of bra, such as a push-up or underwire, that is inherently constricting. In addition, when compared with the women in the standard group who removed their bras before experiencing physical signs of irritation, the women in the cancer group may have had a higher threshold of breast discomfort.

■ ***Do you wear a bra or breast-supporting garment to sleep?***

Results: Standard group: 3% yes
Cancer group: 18% yes

Many people wear clothing to sleep. Usually sleepwear is comfortable, loose-fitting apparel: T-shirts, nightshirts, loose nightgowns, and the like.

On the other hand, bed is also a place for sex. Lingerie or sexy undergarments often squeeze breasts into pinup dimensions, serving as a costume for the performance to follow.

Another reason a woman might wear a bra to sleep is that bras are standard underwear, and some people believe that underwear must be worn all the time, even in bed. Then there are the women who find the snug feeling of a bra comfortable. We received comments from women that reflected each of these perspectives.

When we asked this question, we made certain to ask what type of nightdress was worn, to ascertain whether

breast lymphatic drainage would possibly be compromised by the garment. If the garment was a bra, there was no difficulty in recording the results. Otherwise, we assumed that most pajamas and nightgowns were loose enough to allow for lymphatic drainage of the breasts, and we interpreted the answer as a "no" response. When the response was vague, the interviewer asked a follow-up question about the tightness of the breast-supporting garment to determine if it was a bralike article. In other words, we erred on the side of underreporting breast constriction rather than that of overreporting.

The responses to this question were no surprise. The percentage of women with breast cancer who slept with bras or breast-supporting garments was six times greater than that for the standard group—18 percent compared with 3 percent. When we examined this sample of women with regard to other questionnaire results, we discovered that most of these women were younger than the rest of their group, being in their forties and fifties. The majority of these younger women chose bras on the basis of appearance, and generally fit the model of women with a fashion focus. By contrast, most of the older women who slept with bras or breast-constricting garments seemed to do so for comfort. Finally, all the women who slept with breast support also wore bras throughout the day and evening. In other words, these people had some garment squeezing their breast tissue virtually twenty-four hours a day.

You would expect that this group of women would also have reported constant discomfort from their bras. Interestingly, this was not the case, with some reporting discomfort only sometimes, and a few even saying they rarely had any discomfort. How can this be? Surely wearing a bra twenty-four hours a day has a good chance of causing red marks and grooves around the breasts and under the

shoulder straps. Surely such physical signs of a problem must impress the consciousness as well as the tissue.

But consider this: Women who cover their breasts with close-fitting garments all the time, perhaps removing them only to bathe and change clothes, may have little awareness of the feelings of their breasts. Irritations and other discomforts will disappear from the mind if they are constant, just as we ignore the aches and pains of aging. We tend to get used to certain stimuli, unless they change significantly for the worse. In this case, the discomfort caused by the continual wearing of a bra may be ignored until the breast tissue deteriorates to the point of disease.

After years of wearing a bra and seeing red marks on their bodies, these women may have come to accept bra marks as signs of womanhood. In fact, when we asked one woman if her bra left red marks on her skin, she responded, "Oh, *those.* I suppose I have them. But doesn't every woman?"

Obviously, some women have come to accept the tribulations of bra wearing as part of life or as the price to pay for fashion. Other women may feel no discomfort from their bras, leading them to ignore any physical evidence of irritation. But this study suggests that these attitudes better characterize women with breast cancer than the general female population.

But what about the other extreme? How do women who do not wear bras fit into this picture? This brings us to the next question.

■ ***Do you wear a bra?***

Results: Standard group: 5% no
Cancer group: 0.24% no

As you would expect, most of the women we questioned did wear bras. However, and this was astounding, only

five woman in the cancer group did not wear a bra—approximately 0.24 percent of those surveyed. Three of these women were in their sixties, one was in her seventies, and one was in her thirties. The older women said that they had worn bras for most of their lives, but no longer did so. The young woman had a history of multiple radiation exposures from X rays taken of her chest as a young adult.

On the other hand, 5 percent of the standard group was braless. Approximately 40 percent of these women stated that they "sometimes" or "occasionally" wore a bra for special occasions or with certain clothing, but for the most part they did not wear one. The majority of these women had stopped regularly wearing bras in young adulthood. Some had never worn bras. Their ages spanned the entire spectrum, with most in their forties and fifties.

While we will not know how many of these women might go on to get breast cancer, the fact that virtually all of the women in the cancer group wore bras further supports our hypothesis that bras can trigger the development of breast cancer.

■ ***Have you breastfed?***

Results: Standard group: 14% yes
Cancer group: 4% yes

Our society places so much emphasis on the appearance of breasts that we often forget that breasts are organs with specific biological functions. Our bodies, of course, know what breasts are for. Indeed, pregnancy is a time of extensive breast development. What was fat in the immature breast becomes secretory tissue. The breasts become an amazing milk-production factory, filtering nutrients from the blood; transforming them into proteins, fats, and sugars; and secreting them for the nourishment of an infant.

Pregnancy leads to only part of the development of the

breasts as milk producers. The rest of the development takes place as the newborn nurses. Like all organs, the breast gets stronger and more developed as it is used. The blood supply to the breast increases dramatically with use, as does the drainage of lymph away from the breast. Active breast tissue needs more nutrients and oxygen than does inactive tissue, and when there is greater blood circulation, there is greater lymphatic drainage. Eventually, after they have been used as intended, the breasts typically reduce in size and become less firm than they were prior to pregnancy.

Of course, it is this prospect of softer, less-firm breasts that leads some women to opt for bottle feeding over breastfeeding. Other women choose bottle feeding because of the need to return to work as soon as possible, perhaps after only a month of maternity leave. Still other women abandon breastfeeding because of nipple discomfort, the development of breast infections (mastitis), or other health concerns. And, of course, during historical periods in which the medical community has promoted bottle feeding over breastfeeding, women have been either actively discouraged from nursing or deterred by the lack of available support.

The results of our questionnaire show that women in the cancer group were less likely to have breastfed their babies than those in the standard group. Only 4 percent of the cancer group nursed their babies, while 14 percent of the standard group did so.

These results support the claim that better-developed breasts may have a lower incidence of cancer. When you consider the constriction of the breast tissue by a bra, it makes sense that tissue with greater drainage could be healthier. Additionally, breasts that have lactated also tend to reduce in size and become more flexible once the nursing is over. While some women may see this as an unfor-

tunate outcome of breastfeeding, it may be that these smaller, more flexible breasts are squeezed less by bras than are firmer, underdeveloped breasts. The more flexible the breast tissue, the less resistance it offers to the shaping pressures of a bra.

According to other research, women who have never had children have a higher incidence of breast cancer. Obviously, women who have never given birth have never breastfed. This is consistent with our results, and we can now understand a possible mechanism for this finding. Of all women, those who have never experienced full breast development through the stimulation of either pregnancy or lactation will have the least-developed lymphatic system.

An interesting historical pattern of breastfeeding deserves mention. The historical decline in breastfeeding between 1940 and 1980 may now be exacting its price on women. We are experiencing an explosion of breast cancer cases. This increase is a recent phenomenon, with the major increases having begun in the 1980s. According to the American Cancer Society, in 1970 there were 69,000 cases of breast cancer; in 1980 the figure was 109,000; and by 1990 it had reached 150,000. Some of this increased incidence is possibly attributable to better and earlier detection of tumors. However, many experts agree there is more to these increased rates than simply improved detection and reporting.

As discussed in Chapter 3, many researchers believe that toxins are the primary cause of cancer. It may be that environmental toxins that have increased over the past decades are now revealing their cancer-causing ability. But perhaps the body's defenses have been sabotaged as well, making this toxin exposure even more damaging.

How does this tie in with a lack of breastfeeding experience? A less-developed breast may suffer from bra con-

striction more easily than a developed one, as toxins could be even more concentrated and have a greater chance of damaging such tissue. Remember that breast cancer is age-related. Many of today's breast cancer cases are occurring in women who were mothers during that bottle-feeding period of the 1940s to the 1980s.

REVIEWING THE FINDINGS

What do our findings suggest about a connection between bras and breast cancer? The first impression is that there were meaningful differences between the responses of the cancer group and those of the standard group. This was the first test of the hypotheses behind the Bra and Breast Cancer Study. If our theory was incorrect, we would not expect to find much difference between the two groups in their responses to our questionnaire. On the other hand, we would expect, and would demand, that the two groups demonstrate significantly different responses to the questionnaire for us to conclude that the variables studies were important and possibly valid. Indeed, the cancer group differed from the standard group in many ways relating to bra wearing and attitudes toward breasts. This tells us that bras may be a significant factor in the development of breast cancer, and that the breast cancer group can be characterized as a subculture within the larger population of women.

How significant a factor do bras seem to be in the development of breast cancer? Let's analyze the results.

The standard group represents women in the public at large with no known diagnosis of breast cancer. However, we know that approximately 13 percent of these women will eventually develop breast cancer, according to current statistics presented by the medical community. Who constitutes this 13 percent? We may be able to identify them

by examining the cancer group. Our questionnaire defined the general attitudes and behaviors of women with a known breast cancer diagnosis as regards their bras and breasts. We would expect, then, that the "hidden" 13 percent of standard-group women who will later develop the disease will conform to this cancer group profile.

One note before we delve into the numbers that follow. At times we will indicate results in terms of percentages, and at other times we will speak of "-fold" differences, which, in this case, refers to multiples of 100 percent. For example, a 6-fold difference means that there is a 600-percent difference between the compared variables. When referring to percentages of over 100, this makes the discussion easier to understand. Otherwise, we would have to refer to a 125-fold difference as a 12,500-percent difference. But differences of less than 100 percent would be confusing when expressed this way; a 30-percent difference would be referred to as a 1.3-fold difference. Therefore, in the discussion that follows, we will use either a multiple or a percentage to express differences, whichever seems clearest. Hopefully this will not generate any confusion.

Further, the mathematical process we used to determine the relative rates of breast cancer incidence involved comparing the standard and cancer groups in terms of specific bra-wearing behavior. If a certain behavior was more prevalent in the cancer group than the standard group, this suggests that the behavior is more associated with women who develop breast cancer. Conversely, if the behavior was more prevalent in the standard group, it suggests that the behavior is associated with women who will not develop breast cancer. Any behavior that occurred to the same degree in both groups, when expressed as a percentage, is regarded as being neutral.

To illustrate, let's say we asked women about the colors of bras worn. If the cancer and standard groups had about

the same distribution of bra colors, we would conclude that bra color has nothing to do with developing cancer. On the other hand, if certain color bras leached toxins more than others, or if, say, blue bras were typically tighter than white ones, we would expect to find a difference between the groups regarding colors of bras worn. (In the actual research model, we expected bra color to be neutral, which is why we ignored it as a variable.)

In summary, then, we ascertained relative risk factors by determining the percentage of women in each group with a given behavior, and expressing the relationship of those percentages as a ratio. For example, if 50 percent of the cancer group exhibited a certain behavior, while 25 percent of the standard group exhibited that behavior, we would conclude that women with that behavior have a 2-fold higher incidence of breast cancer than do women in the standard group.

The Analysis

Let's first address the number of women who wear no bras at all. According to the results of the BBC Study, just 5 of the 2,056 women in the cancer group had been braless, a mere 0.24 percent. The number is sufficiently small to permit us to treat the entire group—100 percent—as bra wearers. Now, consider the response to the question concerning how long a bra is worn per day. We have divided up the total into those who wear them less than twelve hours daily, and those who wear them more than twelve hours daily. Keep in mind that the category of those wearing bras for more than twelve hours daily includes those women who wear bras to sleep. We will later identify two subgroups: those women who wear bras more than twelve hours but not to sleep, and those who wear their bras virtually twenty-four hours a day.

Virtually all the women in the cancer group, 99 percent, said they had worn their bras twelve hours or more per day. Since essentially all the cancer group women were in this category of extensive daily bra wearing, we would expect a standard group woman who will later develop breast cancer to also be in this category. In other words, we can expect that women who will later develop breast cancer will have a history of wearing a bra more than twelve hours daily.

We have thus located the vast majority of the 13 percent of the standard group that was previously "hidden." This may allow us to better predict which women will develop breast cancer than we could with a generalized 13-percent estimate.

In the standard group, 80 percent of those women who wore bras did so over twelve hours daily, including those who wore bras to sleep. We can now expect that new breast cancer cases will come from women with this behavior of bra wearing. Compared with the general standard group, this behavioral subgroup has a 30-percent higher incidence of breast cancer. Further, on the basis of our theory, virtually none of the women in the 24 percent of the standard group who either wore no bra or who wore a bra for less than twelve hours daily will develop breast cancer.

We can also separate out the women who wear a bra to sleep from those who wear one over twelve hours daily, but remove it at bedtime. *By wearing a bra for more than twelve hours daily, but not to sleep, a woman increases her chances of developing breast cancer by 11 percent, compared with the general standard population.*

How about those women who wear their bras for less than twelve hours daily? We know that only 1 percent of the cancer group was in this category, compared with 20 percent of the standard group. This means that wearing a bra less than twelve hours daily is a behavior associated with women who more often avoid breast cancer.

From the calculations, it would appear that there is a 19-fold protection against breast cancer achieved by wearing a bra for less than twelve hours daily, as compared with the general standard population. In other words, the average white American woman is 19 times more likely to develop breast cancer than is a woman who wears a bra for less than twelve hours daily. Also, women who wear bras for over twelve hours daily, but not to sleep, have a 21-fold greater chance of developing breast cancer than do women who remove their bras before twelve hours.

When we consider those women who wear their bras to sleep, we see that 18 percent of the cancer group did so, compared with 3 percent of the standard group. *This means that there is a 6-fold greater incidence of breast cancer among women who wear a bra all day and to bed, or virtually twenty-four hours per day, than among the general population.*

When we compare those women who wear their bras for less than twelve hours a day to those who wear them twenty-four hours a day, we see an enormous and extremely significant difference in breast cancer rates. *Women who wear their bras all the time have a 113-fold increase in breast cancer incidence when compared with women who wear their bras less than twelve hours daily!*

This remarkable and dramatic difference in breast cancer incidence is also the case for women who do not wear bras at all. Only 0.24 percent of the cancer group women were braless, compared with 5 percent of the standard group women. *It follows that going braless is associated with a 21-fold reduction in breast cancer incidence compared with the general standard population. This also means that wearing a bra for less than twelve hours daily is associated with a 10-percent greater incidence of breast cancer than is not wearing a bra. Further, wearing a bra all the time is associated with a 125-fold greater incidence of breast cancer than is wearing no bra at all.*

Finally, we can assess the effect of breastfeeding on breast cancer incidence. In the BBC Study, only 4 percent

of the cancer group women breastfed their infants, while 14 percent of the standard group did so. *It follows that breastfeeding affords a 3.5-fold protection against breast cancer.* These results are consistent with estimates suggested by other research regarding the benefits of breastfeeding in the prevention of breast cancer.

Putting the Numbers in Perspective

We all now know that cigarette smoking causes lung cancer. Lung cancer is 10 to 30 times more common in smokers than it is in nonsmokers. In the Bra and Breast Cancer Study, we learned that women who wear bras twenty-four hours a day have a 125-fold greater chance of getting breast cancer than do women who do not wear bras at all, and a 113-fold greater chance of getting breast cancer than do women who wear bras for less than twelve hours daily. This is anywhere from 4 to 12 times greater in significance than the connection between cigarette smoking and lung cancer! (See the inset on page 128.)

These numbers may be powerful indicators of how women develop breast cancer through their use of bras. But we must not lose the bigger picture in this forest of numbers. A woman's attitude regarding her breasts and bras will determine how long she wears her bra each day, the type and tightness of the bra she chooses, whether she breastfeeds her baby, and so forth. In a sense, bra-wearing behavior is a result of many cultural biases and attitudes.

What about women who develop breast cancer but do not show all of the behaviors and attitudes just discussed? While the BBC Study has suggested a significant causal relationship between bra wearing and breast cancer, the entire story of cancer also includes toxin exposure, radiation exposure, and overall health. We must realize that there is a great complexity of cultural factors and behaviors

Getting Past the Smoke Screen

Imagine shopping for a bra, and finding that the small label on the back contained the words, "Warning: Bra Wearing May Be Hazardous to Your Health." If this sounds impossible, consider the case of smoking and lung cancer.

Today, few people question the fact that smoking is detrimental to health. Just read the warnings on cigarettes packages: "Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy"; "Quitting Smoking Now Greatly Reduces Risks to Your Health"; "Cigarette Smoke Contains Carbon Monoxide." Consider, too, the ever-tightening restrictions on smoking in public. It seems impossible these days for anyone to be overprotected from the harmful effects of tobacco.

But smoking wasn't always recognized as a serious health threat. It took many years for studies to conclude that smoking was a health hazard, and still more time for the United States government to issue an official warning. The story of how this habit came to be viewed as a risk is an interesting one.

Efforts to assess smoking's health risks began as far back as 1859, when a French physician named Bouisson observed sixty-eight patients with cancer of the mouth, tonsils, tongue, or lips. All of the patients used tobacco, with all but two smoking short-stemmed clay pipes. Dr. Bouisson suggested that the heat and tobacco products may have been factors in causing the cancers. Whether or not there was a causal connection between the habit and the cancers, short-stemmed clay pipes soon went out of style, along with scientific interest in smoking and health.

Other studies conducted in the years following Bouisson's generated little attention. But in the 1930s, three separate

observations marked renewed curiosity in smoking's relationship to health. In 1936, Dr. Alton Ochner, a widely-known surgeon from New Orleans, Louisiana, speculated that cigarettes might be a major factor in lung cancer since most of his lung cancer patients were smokers. Two years later, Raymond Pearl of Johns Hopkins University reported statistical evidence that smokers had a shorter life expectancy than nonsmokers. And in 1939, A.H. Roffo, in Argentina, reported producing cancers by painting tobacco extracts on the backs of rabbits.

Unfortunately, these low-profile studies had little effect. In fact, since the turn of the century, per capita cigarette consumption had increased markedly: 50 cigarettes per person before 1910; 138 in 1910; 1,365 in 1930; 1,828 in 1940; and 3,322 in 1950. The brilliant advertising campaigns waged by the cigarette industries had transformed the act of smoking into a positive social behavior—good for your health and your image—leaving little room for detractors.

The first major warning appeared in 1950, in a paper authored by E.L. Wynder and E.A. Graham in the "Journal of the American Medical Association." In that report, the researchers noted that almost all patients with lung cancer had been long-time heavy cigarette smokers, and that lung cancer rarely occurred in nonsmokers. Although this report was carried by a prestigious medical journal, few heeded its message.

Soon after, scientists concluded that the effects of smoking could best be evaluated by studying a group of people over a period of years. In 1951, two such studies—each independent and unknown to the other—were begun by research groups in the United States and Great Britain. In Great Britain, Drs. W. Richard Doll and A. Bradford Hill used questionnaires to study the smoking habits of physicians. With the sponsorship of the American Cancer Society, Dr. E. Cuyler Hammond and Dr. Daniel Horn led the American study. The first results of both

studies were published in 1954 and received a great deal of attention and public interest. When all the data was compiled, the studies reached the same conclusion: The risk of death from lung cancer increases directly with the number of cigarettes smoked per day.

Perhaps to the credit of the British and American research groups, per capita smoking of cigarettes dropped in 1953 and 1954. But in an effort to boost their waning sales, cigarette companies in the mid-1950s introduced filter-tipped cigarettes, which many smokers believed were less harmful to their health than the nonfilter types. By 1964, the popularity of the filter-tips had not only increased the industry's sales, but had also cut its costs, as less tobacco is used in filtered cigarettes.

In January of 1964—ten years after the British and American studies had presented their initial results—the association between lung cancer and smoking was finally made official in the United States with the release of Surgeon General Luther Terry's report on smoking and health. In the surgeon general's report, the study panel found no doubt about the role of cigarette smoking in causing cancer of the lungs. It stated that in men who smoke cigarettes, the death rate from lung cancer is 1,000 percent higher than in nonsmoking males. The study also found smoking to be a cause of chronic bronchitis, emphysema, and coronary artery disease.

Given the gravity of the 1964 report, decisive action was called for. So in 1965, President Lyndon Johnson signed a much-debated bill requiring a warning on all boxes and cartons of cigarettes. Yet, despite the definitiveness of the surgeon general's report, the first warning read simply: "Caution, cigarette smoking may be hazardous to your health."

Unfortunately, the behavior of smokers and the tobacco industry was unchanged shortly after the report's release. The tobacco industry refused to accept defeat and, for the most part,

smokers kept smoking. In fact, tobacco industry president G.V. Allen called for more research, rejecting the report as the final word in the debate on the pleasures and risks of smoking. Although cigarette sales had declined following the surgeon general's statement, by year's end, total sales were almost back to January 1964 levels.

Since the mid-1960s, anti-tobacco activity in the United States has been vigorous. Some of the major blows to smokers and the tobacco companies have included the 1969 banning of radio and TV cigarette ads by Congress, the surgeon general's linking of passive smoke with lung cancer and other diseases in 1986, and the surgeon general's 1988 declaration that nicotine is addictive.

But anti-tobacco forces state that the stern health warnings regarding smoking are still not being heeded. As reasons for concern, they cite the end of a twenty-five-year decline in cigarette smoking, aggressive tobacco industry lobbying, and shrewd marketing tactics, as well as the sobering fact that, despite more than a century of study and over three decades of warnings, tobacco still kills more than 420,000 Americans every year.

The problem with the way the United States has treated the hazard posed by smoking is, unfortunately, typical of the way we handle many health risks. How long must it take—how long should it take—for us to recognize a real problem, and then do something about it?

associated with breast cancer. We should also keep in mind that some factors may counterbalance other factors. For example, a higher toxin exposure or a history of radiation to the chest could increase the risk of developing breast cancer. However, removing the bra before twelve hours of wearing time could lower the risk. These two opposing

factors may cancel each other out so that a woman with such a history and behavior might have the same risk of developing breast cancer as a woman who has had normal toxin and radiation exposure, but wears her bra for over twelve hours a day.

Nevertheless, the results of the research are significant and clear: Women who want to avoid breast cancer should wear a bra for the shortest period of time possible—certainly for less than twelve hours daily. This is no surprise, given the world statistics on breast cancer. As discussed earlier in the chapter, where there are no bras, there is little breast cancer.

FURTHER THOUGHTS ABOUT THE BBC STUDY

We must make a final point about the BBC Study. Clearly, in any ground-breaking study of this type, there are factors and variables that could not have been predicted prior to the study. In retrospect, we wish that we had asked for more detailed responses when questioning the women about their length of daily bra wearing. We assumed that working women would wear a bra to work, resulting in a minimum of ten hours of wearing time once commuting time was factored in. On the other hand, many homemakers might wear their bras for shorter periods of time, or intermittently, perhaps only when going out in public. These women might therefore wear their bras for as few as two to four hours daily. If we had made such distinctions in our questionnaire, we might have been able to further characterize the breast cancer risks for women who wear a bra for less than twelve hours daily.

The same distinctions could have been made for the group of women who wear their bras for more than twelve hours daily. Some of the women in this group may wear their bras for eighteen hours—say, from seven in the morn-

ing until midnight. Others may wear their bras for only twelve hours daily. Reexamining this group with finer time distinctions might reveal a critical number of bra-wearing hours after which the risk for developing breast cancer increases dramatically.

It should also be realized that the results of this research reflect a given average exposure to environmental toxins. But toxin exposure is changing over time. Every year we become exposed to new, potentially more hazardous toxins, and to increasing amounts of toxins in general. Since constriction of breast tissue with bras may focus these toxins in the breast because of diminished lymphatic drainage, it follows that more hazardous toxins, or a greater concentration of them in the environment, would possibly reduce the amount of time the breasts need to be constricted by a bra to damage the breast tissue. That is, more dangerous and injurious toxins may do their damage to the breasts in a shorter period of time.

In retrospect, it also would have been valuable to examine the effect of bra type on cancer rates. While the results are clear about the effect of bras in general, finer distinctions between bra types might be informative. Push-up bras and other bras with underwires are typically tight fitting. These would be expected to exert greater pressure on the breast tissue, causing more damage than would more comfortable, looser-fitting bras worn for the same period of time. One problem we had with addressing this issue is that many women wear more than one bra type. Further, because of the delay time in the development of breast cancer, it is difficult to question women about the particulars of past bras worn, the length of time each type of bra was worn each day, and so forth. On the other hand, the critical factor may not be bra type as much as bra tightness and length of wearing time. In short, while we suspect that tighter bras accentuate the problems cre-

ated by bras in general, we were not able to make this assessment in detail. Perhaps a different questionnaire design could surmount this problem.

Another factor that we ignored, but that might prove a valuable subject of investigation, is the effect of breast size on bra-wearing behavior. We ignored breast size in the BBC Study because we were looking for lifestyle practices that occurred over a long period of time—a period during which breast size may not have been constant. In addition, breast size has not been considered an established risk factor for breast cancer. However, breast size may influence a woman's attitudes and behaviors toward her breasts and bra. Do those large-breasted women who look for comfort wear bras longer each day than do smaller-breasted women? Or might those smaller-breasted women who look for cleavage be more inclined to wear constrictive push-up or underwire bras? Further studies can examine this issue and gain a more complete picture of bra-wearing behavior.

It might also prove valuable to conduct a study in which a large group of women with similar bra-wearing behavior is divided into two groups. One group would stop wearing bras, and the other would continue wearing bras as before. Over time, would the women who were bra free experience fewer breast problems—such as mastitis, benign lumps, and cancerous tumors—than would the second group?

Of course, the best follow-up experiment would be an individual study done by each woman. What would a woman experience by removing her bra for, say, one month? How would her breasts feel after that time? And how would they feel after she puts her bra back on? This personal experiment might be the only means by which a woman can determine how her bra may be compromising her comfort and health. And it would be risk free, as bras provide no proven health benefits.

We encourage others to reexamine these issues and expand on the information generated by our study. Further, this type of cultural analysis needs to be repeated at least every ten years or so, to allow for changes in toxins, bra styles, social attitudes toward bras and breasts, and other factors that lead to cancer in general.

On the other hand, will bras still be around in ten years, given the power of these findings? Will women continue to wear bras despite the apparent hazards? Understanding the liability of a lifestyle does not guarantee that it will be eliminated from one's life. Look at cigarette smoking.

Whether bras weather this storm or not depends on how they fit into the lives of women and men in our society. What makes bras fashionable? What do they do to women and men? Could our current society allow women to sport a natural bustline?

7

Beauty and the Bra

Is breast cancer a cellular problem whereby mutated cells reproduce out of control and take over the body? Is breast cancer the product of a weakened immune system, poor diet, lack of exercise, high stress, and exposure to toxins? Or is breast cancer the outcome of cultural attitudes and behaviors that culminate in the extended wearing of bras?

It is all of these—and more.

Breast cancer, like all diseases, can be understood on many levels. Humans are made up of cells, live in an environment, and act according to certain customs and beliefs. Knowledge about disease on all these levels is valuable. The search for the cause of a disease, which is essential to curing and preventing it, requires the broadest perspective possible.

We have thus far examined many of the trees within the forest of breast cancer. It is time to see the forest in its entirety. Breast cancer is a culturogenic disease. The forest of breast cancer is the culture that supports the attitudes and behaviors that lead women to be exposed to toxins, wear bras, and develop mutated cells. In the next chapter, we will further explore the hazard posed by toxins. For now, we will focus on bras, fashion, and the culture of breasts.

Be forewarned! It is not easy to look at one's own

culture. We are invested in believing in its value to us, since it is where we live, raise a family, and die. But we can never hope to understand ourselves or our diseases without this broader awareness of our culture.

CLOTHING AND CULTURE

Bras are a specialized form and fashion of clothing. Before we explore the meaning and role of bras in American life, there are some general principles regarding clothing that deserve mention.

The wearing of any particular fashion is a result of many cultural factors that most people take for granted. Women with a fashion focus tend to respond to fashion, or the way women "should" look, as a cultural given. This attitude toward personal appearance typically evokes little, if any, self-reflection. "You're just supposed to look a certain way," would be the motto of these women.

Of course, for women of all cultures throughout history, there have been prescribed standards of appearance that demand conformity. Looking a certain way can be considered "right" or "wrong" from the standpoint of some perceived cultural standard of appearance. Women who subscribe to the dictates of such fashion are playing by the rules of society, and they will find their place among the players. Women who rebel against those norms will suffer the consequences of breaking the rules. And, of course, not all women passively play this game. Some know the rules well and use them to their advantage.

People can be categorized by the appearance of their clothing. Clothing functions as an identification badge, and can indicate caste, social class, income level, occupation, religion, educational level, and so forth. Soldiers look different from farmers or carpenters; monks, nuns, and

priests have their distinctive costumes; white-collar professionals dress differently from blue-collar workers.

The important function of clothing in this regard is to communicate to others an essential aspect of one's social identity. Much social interaction relies on the instantaneous appraisal of others based on dress. Dress conveys a person's intentions and sense of self. Especially important is the fact that virtually all face-to-face social encounters are initiated with a mutual surveying of clothing. This establishment of class differences and social identifications helps to better manage the interaction that follows. Such reliance on clothing for social interchange confers a responsibility on the individual to accurately and faithfully indicate social status. In many cultures, India being one, it is taboo to wear the dress of a caste different from one's own. "Birds of a feather flock together," goes the old saying—and among people, those feathers are clothing.

In modern American society, people frequently use clothing as a costume to get certain results in business or social activities. Hence, people dress for success, and it is not unusual to find people dressing like those with wealth to impart a particular impression. Another aspect of this identity issue is that people are expected to adhere to established fashions, or codes of dress, to impart their social standing in the least ambiguous way possible. Those who ignore dress codes are often ridiculed—not necessarily for aesthetic reasons, but for defying established norms and standards. Since dress codes are used to size people up, those who defy those codes are not easily pigeonholed at first sight, which makes many people uncomfortable.

As for aesthetics, this is another cultural function of fashion. People in a culture develop a shared sense of what looks good. Of course, someone has to come up with the fashion sense in the first place, and typically it has been those with social power who make these decisions. Fashion design-

ers bring their creations to the rich and famous, and the selections of the latter group set the trends for those who are below them in social standing. People without wealth typically dress like those with wealth, not the other way around. Generally, the social climate dictates basic fashion style, and personal aesthetics allows for slight variations on that theme. For example, American professional men essentially have to wear a suit and tie to their offices. However, the color of the suit and tie is up to the discretion of the individual.

The subject of clothing as a cultural phenomenon is a broad one, but from this brief analysis, we see that clothing fashions are not necessarily based on a scientific understanding of the human body and the environment in which it must function. Instead, society becomes the environment to which people must adapt, even if this causes some problems from a biological standpoint.

This brings us to bras and breasts.

BREASTS, BRAS, AND CULTURE

In Western societies, breasts are a major component of a woman's identity. One of the outcomes of the BBC Study has been a fuller appreciation of the meaning of bras and breasts in the American culture. Because our anthropological approach to research is characteristically open ended in its information-gathering style, our questionnaire allowed room for comment by the interviewed women. We were also able to record our impressions about the interviewed women, particularly regarding their appearance, behavior, and attitude toward us, the questions, and themselves.

Many women, particularly those with breast cancer, felt that the questionnaire presented an opportunity to express themselves. Perhaps these women had the need to rationalize or better understand their personal roles in the devel-

opment of the disease. As one woman expressed it to us, "I want to get something off my chest." Interestingly, she had just had a mastectomy. Some women asked us how other women had responded to the questions, showing both an interest in and a lack of knowledge about other women's feelings and behavior regarding their breasts and bras.

An understanding of the cultural significance of bras and breasts is central to the understanding of women's behaviors regarding this aspect of their life. Needless to say, men have their own interpretation of the significance of bras and breasts, and social interaction between the sexes demands that each have some idea of how the other approaches the issue. Usually, these interactions take place unconsciously or reflexively. In a sense, virtually every American knows that bras and breasts are important, but the reason for this importance and a sensitivity to how others might feel about the subject are lacking.

As long as breasts are considered relevant to female identity, as long as breasts (and bras) speak of the way society sees women, women will be sized up by them, both by themselves and others. Their cultural significance helps mold how a woman will feel about herself, based on her natural endowments, and influences how others will treat her.

So let us turn to this broader cultural consciousness, and see why bras have come to be the health hazard that our study suggests they are.

The Nonconforming Breast

If we begin our discussion by examining women who do not wear bras, we see that there are several different life-style approaches that make bra wearing seem undesirable. One was best described by a woman who was grossly

obese and poorly dressed, and who generally projected an image of low self-esteem. As she put it, "Honey, I'm fifty years old, fat, and ugly, and I don't care what anybody thinks about how I look."

What we see here is the possibility that women who cannot live up to a culturally defined image of beauty may choose to ignore appearance altogether. We can imagine a spectrum of beauty by which women assess themselves. Using this spectrum as a standard, women try to identify with a beauty image that best reflects both who they are, and, with the use of makeup and clothing, what they can look like. Perhaps the most well-adjusted women naturally look as beautiful as they want to look, but for many women, there is a great discrepancy between the way they look upon awakening and the way they look when they are ready to leave the house.

One of the features of this beauty spectrum, as displayed in cosmetic and fashion advertisements, is the assurance that all women, no matter how beautiful, have room for improvement. Typically, the means to this improvement is the use of makeup and fashionable clothing. No matter how unattractive a woman feels, she is promised at least some improvement in appearance through the use of makeup and the right clothing, including bras.

But there are some woman who feel so low on the beauty spectrum that they opt to get out of the beauty race altogether. The obese woman quoted above is an example of this type of woman. It is important to note that her exit from the beauty stage is also indicative of a marginal association with society itself. This woman was economically poor, and her general health did not seem good. In addition, people with her appearance are treated as less important. A subconscious shunning takes place when people who are not attractive, and who don't care about their looks, deal with others. For women who cannot, or

choose not to, conform to the beauty spectrum, there is isolation and ridicule. Americans place a great deal of importance on appearance, and those who stray from the standard guidelines, for whatever reason, are punished.

Some women who could easily conform to society's standards of beauty choose not to do so. These women typically do not wear bras, at least not as an essential garment. Because of their rejection of society's standards, these women may wear no makeup at all, or may wear cosmetics and clothing in a unique way, perhaps even to signal to others their refusal to conform to societal standards. Women in this group include so-called hippies, punks, New Agers, and other subcultures. "Bras aren't natural," commented one free-spirited young woman. One woman who characterized herself as a liberated woman from the 1960s explained, "Bras are for men, so let *them* wear them!"

Then there are those women who elect not to wear a bra because they feel sexier without one. Here we see a variation of our society's usual view of breasts and bras. On one hand, bouncing breasts and protruding nipples are considered sexy. On the other hand, breasts lifted and pushed together by a bra are considered sexy. Upon closer examination, you can see a connection between these two aesthetic judgments. In cultures where bras do not exist, breasts that bounce are not the thrill to men that they are in cultures where breasts are typically concealed by a bra. The old adage "Out of sight, out of mind" does not apply when it comes to breasts and bras, especially when many bra styles make certain that breasts are not really out of sight or mind, but simply under cover. When men are accustomed to seeing covered breasts, the sight of those without a bra is akin to the sight of a naked woman, which, in America, is a sexually provocative situation.

Further, we have women who feel that nature has

endowed them with ideal breasts that meet the standards of society. For some of them, bralessness is a badge of beauty. Women who feel that they do not have facial beauty may be particularly proud of gorgeous breasts. As one braless woman said, "If you've got 'em, flaunt 'em."

Finally, there are women who refuse to play the beauty game, not because they can't win or don't like the rules, but because they feel it is not worthy of their notice. According to one respondent, the beauty issue is "a sales ploy of the beauty industry, which uses advertising and other means to make women buy makeup, certain clothing styles, and other props for altering how a woman looks. It's all very superficial and silly." Another woman stated, "Beauty is reflected in who you are and what you do, not in the shape of your breasts."

Although women who do not wear bras may be motivated by different values, from the standpoint of breast cancer prevention, these women seem to be in the most favorable situation, having about a 20-fold lower incidence of the disease than do women who wear bras. As mentioned before, this has the same statistical significance as a comparison of the health risks of nonsmokers with those of smokers.

Let us now turn our attention to the group of women whose fashion choices may pose health hazards—and who constitute the bulk of American women.

The Conforming Breast

From our results, we have been able to characterize many subcultures of women who wear bras. As we discuss these subcultures, remember that we are not focusing only on the bra-wearing behavior itself, but also on the values, beliefs, and other cultural pressures that result in this behavior.

Conformity and the Power Game

In all cultures, people learn their attitudes and behaviors by observing those around them. But the learning of cultural attitudes and behaviors does not take place solely as a result of observation and imitation. One of the major mechanisms that mold people is the pressure exerted by other people in that society. This power of others to influence the thoughts, attitudes, and behaviors of people is one reason that some women wear bras.

There are two aspects of societal pressure that relate to bra wearing. Some women feel the need to conform to a standard of beauty. Other women wear bras to gain power over others, exploiting their breasts as tools for social control.

Let's first discuss women who wear bras because of a need or desire to conform to societal standards. These women may not feel that bras are particularly important in terms of beauty, but may simply regard them as normal apparel. Dress styles are one of those cultural features that people typically take for granted. We tend to reflexively dress ourselves in the clothing of our time, without reflecting on the reasons for wearing particular garments. The style, fabric, and purpose of the clothing we all wear are functions of our particular culture and moment in history.

Of course, the clothing we wear has to be produced by someone, and generally this is done according to the fashion sense of various designers. Since most designers have accepted the cultural model of the bra-clad breast, the garments they produce often seem to demand the wearing of a bra. For instance, a dress with a plunging neckline may call for a push-up bra, while a strapless dress may call for a strapless bra.

How did bras come to be so widely accepted? From

their creation in the early twentieth century, bras have been mass-produced, mass-marketed garments that increasingly entered into the wardrobes of American women. As our culture shifted into the consumer age we live in today, sucessful fashion marketers sold bras to 95 percent of American women. In modern-day America, young girls now look forward to their first training bra as a rite of passage into womanhood.

Along with this acceptance of bras has come an accepted image of an aesthetically perfect breast. The proliferation of magazines such as *Playboy* has fostered the adoption of this standard of beauty—a standard that is lent credibility by the mass distribution of such magazines. As soon as you set standards for perfection, people are judged accordingly, whether they like it or not. Those so judged may not even agree with the standards set forth. It doesn't matter. They will be appraised in terms of others' standards, not in terms of their own.

The standard established for beautiful breasts has created a means by which women can be ranked with regard to their appearance. Women who have beautiful breasts tend to get more smiles and approval from men than do women who provide less of a view. Of course, breasts are not the only external features by which women are judged. A woman's face, legs, and hair are also assessed by others. Thus, the various elements of a woman's appearance—including her breasts—determine her position in the beauty pecking order. As noted earlier in this book, those women at the top of the pecking order too often get the most attention and help from others, and, in general, tend to be more powerful than those below them. In a society that judges a book by its cover, women born with dull covers have a distinct disadvantage.

It is important to note that because of the strength of societal pressures, some women don't believe that they

even have the option of not wearing a bra. "I have to wear a bra at work," was a frequent comment of the women in our study. "I have to look good." Here, the term "good" takes on a meaning different from "beautiful," since good also refers to a woman's willingness to conform to the standards that society has set for her. Women who rebel against those standards may not look "good" for two reasons. First, their demonstated defiance of socially accepted norms and values may make them viewed as cultural subversives. Second, without a bra, their breasts may display some flaw when compared with "ideal" breasts.

Of course, while some women accept any social ranking determined by breast size and shape, others know that they are winners in the game of looks, and capitalize on their ability to turn heads. These women are better respected and recognized not just by men, but also by other women, who recognize their responsibility to respect those considered more beautiful than they.

It is important to understand that most of the time, this struggle to meet societal standards or to gain power is not conscious. As a cultural phenomenon of huge proportions, the rules of this social contract are often unquestioningly accepted without people even reading the terms of the agreement. Indeed, most women may not even realize that they are playing the game. "It's just what women do," one woman told us when explaining why she wore a bra.

Staying Young

An aspect of beauty that we have not yet discussed is women's desire to stay young. Can bras deliver here, as well? Many women hope that the answer is "yes."

"My bra helps me keep my figure," a fifty-four-year-old woman told us. When you consider the lifting action of bras, you can understand her statement, which, like all

the quotes included in this chapter, reflects the beliefs of many women in our sample. Young breasts that have not yet lactated are typically firm and high. It follows that bras, which offer women a youthful breast shape, are in demand by women who want to retain a youthful appearance.

Enhancing Breast Size

Beyond offering the wearer a younger shape, a bra can make breasts appear larger than they naturally are. In American culture, bigger is almost always better. According to this logic, if breasts are sexy, big breasts are *very* sexy. Thus, many women choose bras that employ padding and shaping to temporarily create a larger bust.

Of course, it should be noted that bigger is perceived as being better only up to a point. When a woman's breast size exceeds some poorly defined limit, she risks being seen as unintelligent, and perhaps even as someone who is sexually promiscuous. Since this culture views breasts as sex objects, the larger a woman's breasts, the more others may identify that woman with sex.

Nevertheless, the desire for larger breasts is often a strong one—so strong, in fact, that it sometimes results in surgical intervention. Breast implants are the surgeon's equivalent of a padded bra. Both are meant to bolster a woman's self-confidence and sex appeal. At the other extreme is breast-reduction surgery, which is sometimes used to allow exceptionally buxom women to achieve a more socially acceptable—and, perhaps, more comfortable—bustline.

Improving Comfort

Some women—especially those with large, heavy breasts—may wear bras to distribute the weight of the

breasts to the shoulders, and to prevent an excessive and annoying movement of the breasts during sports or everyday activities. However, when a woman has been raised in a bra-wearing culture, one may question how much discomfort is due to the actual weight of the breasts, and how much is due to the woman's culture-created intolerance for the feeling of being braless.

As mentioned in earlier chapters, comfort is a relative state. When compared with corsets, bras are great. But modern-day women who have been wearing bras since the first budding of their adolescent breasts have little frame of reference for a comparison. They simply have not had much experience of breasts without bras. To assess breast comfort, then, they compare one bra with another of a different size or style. If these women were to get used to the experience of being braless—allowing their breasts to reach a natural bustline, instead of artificially placing them high on the chest wall—they might actually enjoy far greater comfort.

Defying Gravity

Perhaps one of the most compelling reasons that many women wear bras is the myth that bras can prevent the breasts from sagging. This myth was the focus of medical debate in 1972. In the *Journal of the American Medical Association,* Alfred B. Sundquist, a physician from Manchester, Connecticut, asked the question:

> What do you think of the recent trend among some young women of going braless? Should they not be warned by the American Medical Association that the lack of mammary support may lead to the development of pendulous breasts caused by stretching of the fibrous tissue attaching the breasts to the chest?

Beyond the question asked by the good doctor is the question of how "pendulous breasts" became a medical issue and not merely one of fashion. Medically, such breasts cause no problem. But medicine concerns itself with many other cosmetic issues, as well. So a response from an American Medical Association consultant who was a surgeon appeared in the journal:

> Yes, the fibrous attachments which support the breasts do stretch under the influence of gravity, more so in some women than in others, and especially in those breasts naturally large or fat or pregnant or lactating. Once lengthened by tension, these fibrous connections (Cooper's suspensory ligaments) do not resume youthful dimensions.

A second consultant added that "a supportive bra" is important to keep Western women from developing the breast profile prominent "in numerous cultures where bras are never worn."

Soon after these comments were made, bralessness went out of vogue. But a medical myth about bras and breasts had been created. Why is this a myth and not a fact? As Christine Haycock, a surgeon at the New Jersey Medical School in Newark, explained, "Cooper's ligaments have nothing to do with supporting the breast tissue. They just serve to divide the breast into compartments." The reason breasts succumb to gravity over time is not related to ligaments or even to breast size. It is due to inherited characteristics such as skin elasticity and breast density, which is the ratio of lightweight fat to heavier glands. Our research uncovered no scientific evidence supporting the notion that bras can prevent breasts from sagging. In fact, numerous women in our study admitted that lifelong bra wearing had failed to keep their breasts from "drooping."

The real issue here is one discussed earlier in the chapter. Women simply do not want to look old. Aging is a frightening process in this culture, especially for women. Anti-wrinkle creams, hair coloring, bras and girdles, and cosmetic surgery all feed on women's fears of looking old and, presumably, less attractive. The myth that bras can prevent breast aging is too enticing not to be believed. The evidence that older women with a lifetime history of bra wearing have not escaped this aging process has not overthrown the myth. Hope springs eternal, even in defiance of reason. And for those women who do recognize the inevitability of aging, a bra, they have been led to believe, can at least make them *look* younger than they are.

The idea that a garment can improve women's health is not a new one. In the late nineteenth and early twentieth centuries, corsets were considered to be beneficial both for a woman's moral character and for her physical state. The health value of corsets was expressed by *Vogue* in 1932: "Women's abdominal muscles are notoriously weak, and even hard exercise doesn't keep your figure from spreading if you don't give it some support."

This view of the female body justified the fashion of corsets on biological grounds—grounds that have since been shaken and shown to be absurd. From our vantage point of the late twentieth century, this justification sounds like a rationalization for the fashion of corsets, not a sound piece of medical advice. But bras, the direct descendants of corsets, have been recommended with the same type of medical rationalization.

Is Western culture capable of changing sufficiently to allow women to reduce their bra-wearing time? Are women who feel that they cannot survive without a bra simply reflecting the powerful influence that culture has over us all? As we approach a rational, balanced resolution to this conflict between culture and health, let us examine

the roots of our lifestyles themselves. If lifestyles cause problems, what causes lifestyles?

IN THE BEGINNING . . .

Traditionally, lifestyles have had their foundation in religion. Religions address *metaphysics,* assumptions concerning the nature of the world; and *ethics,* the rules and standards that guide people's behavior within that world. The Old and New Testaments are, in part, compilations of lifestyle advice handed down throughout the centuries. In fact, the works of all the great religions, Eastern and Western, examine how people are supposed to live to ensure optimal health, longevity, and happiness.

When you study the great religions, you find that their messages are fundamentally similar, with any differences usually reflecting the environmental and cultural idiosyncrasies of different civilizations. Humans in their environments are not as dissimilar throughout the world or throughout history as the trappings of material culture would suggest. We all are *Homo sapiens,* and we all live on planet Earth. These two inescapable facts tie all cultures together in some form of kinship.

When people follow the age-old lifestyle formulas provided by the great religions, they follow a path that has led others through life for centuries, if not millennia. Wisdom concerning food tells the followers what is to be eaten and how it is to be prepared, as well as defining times of fasting. Religious doctrine also spells out the social roles and obligations of men and women, parents and children. Rites of passage from one stage of life into another are defined and ritualized. And styles of clothing are sometimes prescribed, as with the skullcap of the Jews, the plain clothing of the Amish, and the robe of the Buddhist monk.

Most modern-day Americans no longer turn to their

Bible or to their religious leaders for advice on lifestyle issues. Many turn instead to the popular media. Children learn early in life that television and movies provide the lifestyle role models for their society. Infomercials fill the radio and TV airwaves, motivating people to live a certain way, consume certain products, and adopt a certain attitude. Popular magazines serve as bibles for young men and women alike, telling them the correct way to dress and act. Movie stars and other celebrities are regarded as role models and are emulated in dress and behavior.

What has happened in America is the partial displacement of values and behaviors rooted in religion and antiquity, with values and behaviors rooted in the economic interests of those who pay for the advertisements. In a culture in which "new and improved" is a successful sales pitch, the concept of tradition has come to mean years or, at most, decades, instead of centuries and millennia. Lifestyle choices come and go like fads. In fact, they *are* fads. The result is a destabilized culture that is not necessarily evolving as much as it is aimlessly changing. The forces that mold our lifestyles are not necessarily founded on age-old wisdom, or even on a *new* conception of metaphysics or ethics. Instead, it is Madison Avenue—advertising and public relations firms—that hands down lifestyle decisions. And the ultimate purpose of these decisions is not to enhance health, longevity, or happiness, but to bolster the economic bottom line of those who stand to gain from the acceptance of these decisions.

We are not claiming that business has waged a war against society. People are not being forced into compliance with these well-advertised lifestyle choices. The success of this economy-focused manipulation of culture is due to the many Americans who have elevated pop culture to religious significance. Throughout the world and throughout recorded history, all peoples have had some

religious affiliation. The uncertainty of natural events and the fear of the unknown compels people to seek metaphysical and ethical solutions. For better or worse, the decline of religion in American life has created a void that has been filled by popular secular culture. And the new god's name is fashion.

One value of age-old lifestyle practices is that they have withstood the test of time. However, the lifestyles dictated by the religion of fashion cannot boast such a strength. Focused on fads, sound bites, and consumerism, the lifestyles dictated by fashion are in constant flux. The ultimate determinant of fashionable lifestyles is what sells, not what makes sense—or what is healthy or wise.

One of the fundamental practices dictated by fashion is the wearing of bras, and most women have embraced this practice without question. How highly is the bra valued? Typically, religions prescribe rites of passage that mark the entry of the initiate into the religious and social world of the adult. In modern America, young women eagerly anticipate their entry into adulthood—and the adult world of fashion—with the ritual of wearing their first bra.

Viewing fashion as a religion explains why so many American women have a fashion focus that outweighs their body-sense. All religions have devoted followers who willingly sacrifice comfort and health as a sign of devotion to their god. When a woman in high heels, a tight skirt, and a constricting bra suffers the discomforts of fashion for a sense of happiness, identity, or conformity, she is behaving like any self-denying religious follower.

This analysis is not meant to diminish the positive achievements of American culture, or to suggest that Americans should attend church or synagogue more often. Our goal is to understand the larger context in which women find themselves making lifestyle choices regarding

their breasts and the wearing of bras. Altering these attitudes and behaviors is not easy, as it is akin to challenging a person's religious beliefs. And from a practical standpoint, bras as a fashion will probably not go away. Given that some women will continue to wear bras, at least for the near future, is there anything that these women can do to prevent breast cancer? This is the focus of our next chapter.

8

To *B* or Not to *B*

Throughout our research, our goal has been to help women avoid the devastation of breast cancer. Our approach to this subject has been both novel and promising. Factors ignored in previous breast cancer prevention research—such as the role of the lymphatics and the wearing of bras—now seem important avenues for further investigation.

We now see that our culture, and the values, attitudes, and behaviors it instills, may be a major cause of breast cancer. Specifically, the two major breast cancer triggers seem to be the presence of toxins, and the wearing of a bra for over twelve hours daily. Ideally, it would be best to avoid all toxins and to abandon the bra. However, this may be more easily said than done. In Chapter Four, we discussed the toxic nature of our environment. Toxins appear to have infiltrated every aspect of our lives! Yet, while not totally avoidable, toxic exposure can be reduced.

Unlike toxins, bra wearing is a personal behavior, and therefore is within a woman's control. Yet not all women will stop wearing bras. For those who don't, the risk posed by bra wearing, like the risk posed by toxins, can be decreased by choosing and wearing a bra in a way that minimizes harm to the body.

Other lifestyle choices, too, can work to reduce the risk

of breast cancer. Exercise, proper diet, and other elements can be combined to create a lifestyle that allows the body to fight off disease, and to reach a greater level of well-being.

REDUCING TOXIC EXPOSURE

The number of toxins in our lives seems greater than ever, and is constantly on the rise. Fortunately, there are many ways in which we can reduce toxin intake. Mary Kerney Levenstein's book *Everyday Cancer Risks and How to Avoid Them* details the steps you can take to reduce your toxic exposure. For instance, you can eat less meat, poultry, and fishfoods that often contain pesticides and other toxins. When you do choose to eat these foods, you can buy organic products, or, when you can't find organic meat, you can remove all fat, as toxins tend to accumulate in fatty tissue. You can further limit your toxin exposure by filtering your water and by eating organically grown fruits and vegetables.

As you strive for a healthier lifestyle, keep in mind that our skin absorbs many chemicals through contact with our clothes. Be aware that many laundry detergents contain perfumes and dyes, and search out one that is perfume- and dye-free. Also consider that new clothing is often treated with chemicals that prevent insect damage and fabric deterioration. You can sometimes smell these chemicals, which should be washed away before the garment is worn.

Then there is the garment itself. Certain synthetic fabrics are composed of chemicals, and may contain additional chemicals used in the production process. While fabrics that contain these substances are, of course, never healthful, they may be particularly harmful when used to make bras and other underwear—garments that remain in intimate contact with our skin. For instance, bras made with spandex fibers

may contain a number of chemicals, including phenolic- and sulphur-containing compounds, that have been shown to cause skin problems. H.L. Joseph and H.I. Maibach's 1967 article in the *Journal of the American Medical Association* discussed cases of contact dermatitis that were caused by spandex brassieres. Another article, written by S.S. Bleehan and P. Hall-Smith and published in a 1970 issue of the *British Journal of Dermatology*, cited cases of skin color loss that, again, were due to spandex bras. In this instance, the skin under the bra was apparently depigmented by the chemical mercaptobenzothiazole (MBZ), which had been used in the garment's production process. This chemical remained in the fabric and leached out onto the skin, causing problems in sensitive individuals.

It may surprise you to hear that toxins can enter the body through the skin. Indeed, like the lungs, the skin is capable of absorbing chemicals. In fact, this absorptive capacity of the skin is often exploited by physicians, who administer certain drugs through skin patches. What does this tell you about other chemicals—found in skin lotions, underarm deodorants, and other toiletries—that may come in contact with your skin?

One way to avoid the toxins that may leach out of clothing is to choose natural fibers like cotton, linen, and wool. You may even be able to find a bra made of cotton! When you select clothes—or a purchase of any kind, for that matter—keep your nose open. If you smell a chemical, ask yourself if you want that chemical inside you. And finally, as already discussed, wash any new garments before wearing them—using a natural, environmentally safe detergent, of course. This should help eliminate the chemicals used in the production process.

Unfortunately, while you can take steps to reduce your exposure to harmful substances, our modern life makes it impossible to avoid all toxins. For this reason, we must

make certain that we can rid ourselves of toxins as efficiently as possible. This brings us to the subject of bras.

IF YOU FEEL THAT YOU MUST WEAR A BRA

Earlier in the book, we explained that the lymphatic system works to move toxins out of the breast tissue and, ultimately, out of the body. Of course, the best way to maximize the effectiveness of this system is to stop wearing bras altogether. But given the fashions of our time and the widespread acceptance of bras, we know that few women will immediately toss out this popular undergarment. What, then, can these women do to help the lymphatic system do its job? Two aspects of bra wearing can be modified to reduce risk. The first is the way the bra is worn, and the second is the selection of the bra itself. Let's examine each of these in turn.

One excellent course of action for most women is to reduce the time the bra is worn each day. To reiterate our findings, wearing a bra for less than twelve hours daily seems to be extremely protective against breast cancer. Put your bra on as late as possible before going to work or to another outside-the-home activity, and remove it as soon as you return home.

Do not wear a bra to sleep! As suggested by the Bra and Breast Cancer Study, wearing a bra to sleep is the riskiest lifestyle behavior of all. For most women, nighttime is the only time that breast tissues get a much-needed rest from constriction. So remove your bra before going to sleep and, if you do wear clothes in bed, select only loose-fitting garments.

Perhaps just as important as the amount of time the bra is worn is the construction and fit of the bra. When shopping for a bra, keep in mind that the more a bra tries to shape your breasts, the more pressure it will apply to the breast tissue. Therefore, try to avoid bras with underwires or other stiff

breast-shaping components. Also avoid all push-up bras and most sports bras, which typically compress the breasts. Whenever you feel tempted to shape your breasts with a bra, realize that all shaping requires pressure. While the "cup runneth over" look may seem desirable to some women, this effect is achieved by squeezing the breast tissue and possibly hindering lymphatic flow.

Avoid strapless bras for more than occasional use. Because the shoulder straps are missing from these bras, the full weight of the breasts is supported by the side panels and cups. As a result, these bras are especially tight around the armpits, and are more constricting—and potentially more hazardous—than other bra types.

Once you select a bra model, take steps to avoid buying the bra in too small a size. Here are some tips for selecting a proper-fitting bra:

- ❒ Take a deep breath; then exhale and relax. Using a tape measure, take the measurement of your rib cage under your breasts. Add five inches to this measurement. This will give you your "body size." If the measurement is an odd number, skip to the next highest even number.
- ❒ To determine your cup size, first put on a bra that is not too tight. Then take a comfortably snug, but not tight, measurement around your chest across the fullest part of your bust. If the measurement is about one inch bigger than the calculated body size, your cup size is an A; if it is two inches bigger, it is a B; if it is three inches bigger, it is a C; and if it is four inches bigger, it is a D.
- ❒ After selecting the proper size bra, put the garment on and note the way it fits. If the bra cup wrinkles, it is the wrong size—either too large or too small. Try to slide two fingers under the shoulder straps and the side panels. If the bra fits properly, your fingers should easily slide under the garment.

- ❒ Keep in mind that your size estimate may not apply to all bra styles. The best indication of bra size is how the bra feels, particularly after hours of wear. If the bra leaves red marks or grooves on your skin, it is too tight even if you do not experience discomfort when wearing it.
- ❒ Finally, if you experience breast-size fluctuations throughout your menstrual cycle, either select different bras for different times of the month, or purchase your bra when your breasts are at their largest and most tender.

A FINAL FASHION NOTE

We know that, faced with the need to look sharp at the office and throughout much of the evening, many women may feel it is necessary to wear a bra that is not necessarily comfortable, and to keep it on for over twelve hours daily. What can these women do to lower their risk of breast cancer?

Let's consider the assumption that looking smart requires an appearance-enhancing, uncomfortable bra. Many women make this assumption because they have chosen a fashion that emphasizes their breasts. The best solution, then, may be to change the fashion focus to one that still looks stylish, but does not spotlight the bust.

We asked fashion experts to tell us how clothing can be used to deemphasize the breasts. With less of a focus on the bustline, a woman can feel freer to wear a looser bra, or, perhaps, to sometimes dress without a bra. Here are some suggestions:

- ❒ When selecting a blouse, choose one made with a thicker, less clingy material, such as a bulky knit.
- ❒ Choose darker colors, rather than light colors that tend

to draw attention. Also choose solids rather than prints.

- ❒ Avoid blouses with extremely low or high necklines. A low neckline draws the eyes to the breasts, while a high neckline can make less-firm breasts appear even lower.
- ❒ Wear loose-fitting blouses whenever possible. If you must tuck in your blouse, don't tuck it in too tightly. Allow it to hang as loosely as possible.
- ❒ Use accessories like a short necklace, attractive earrings, and a bright belt. They can draw attention away from the breasts.
- ❒ When possible, wear a loose-fitting sweater, a blazer, or a scarf—all useful coverings that can deemphasize the breast. Take care to choose a blazer whose lapels draw attention away from the bustline.

Of course, we can't ignore the fact that the safest way to deal with bras is to not wear them at all. And for women bold enough to make a fashion change by discarding their bras, the health benefits may provide ample compensation for the initial emotional and physical discomforts of going braless. Remember that after wearing a tight-fitting garment against the skin for decades, it takes time to get used to the feeling of bralessness. Fortunately, it need not be an all-or-nothing decision. For some women, a slow adjustment to bra-free living may be the answer. Others may find that some days call for bras more than others, depending on the style of clothing worn and the nature of the occasion.

HELPING THE LYMPHATICS

Whether you choose to wear a bra or not, there are ways

in which you can help your lymphatics do their job. Massage, exercise, and other techniques can be valuable allies in your fight to prevent breast cancer.

Massage is a truly excellent means of promoting the flow of lymph. As you may recall, it is massage created by surrounding muscles that is primarily responsible for the movement of lymph through the lymphatics. Therefore, additional massage can assist the drainage of lymph from your breast tissue.

Note that massage may not be appropriate when cancerous breast tumors are present. Further research into the effect of massage on such tumors is needed before massage can be considered a safe therapy. If you do not have cancer, however, massage can greatly enhance both lymph flow and a general feeling of wellness. The therapeutic effects of massage have been known for centuries, and knowledge of the lymphatics may explain the connection between massage and health. The more sedentary your life, the greater will be the benefits of your massage sessions.

Try to massage your breasts every day, as soon as you remove your bra. Besides aiding the lymphatics, this will make you an expert at breast self-examination, which is recommended for breast cancer screening. When performing the massage, consider the direction of lymph flow, and imitate this flow with your hands by moving them from the nipple outwards, mostly toward the armpit. This will maximize the effectiveness of the massage.

Exercise is yet another great tissue-draining activity. The motion of the muscles during exercise helps to move the lymph through the lymphatics at a rate that is ten to fifteen times faster than the usual rate. In fact, exercise has been shown by some investigators to reduce the incidence of breast cancer significantly, although the mechanism for this protective effect has been unknown—until now. And,

of course, exercise also increases general circulation. How much exercise do you need? As always, use your body-sense to determine how much is enough.

Deep breathing, too, is an excellent means of assisting lymphatic flow. It is also a wonderful way to reduce stress, provide your body with much-needed oxygen, and revitalize your tissues.

If you're looking for an entertaining way to help your lymph system, try singing. As the chest and abdominal muscles expand and contract during breathing, the lymph will be pumped up toward the heart.

Earlier in the chapter, we discussed how dietary choices—specifically, the use of organically grown foods, and the limiting of animal foods—can reduce the toxins in your body, and thereby help your lymphatics. Keep in mind that a good diet is not merely one that limits toxins, but also one that is well-balanced and rich in the nutrients that are necessary for the proper functioning of the body. Books like Dr. Charles Simone's *Cancer & Nutrition* can help you choose a diet that is both well-balanced and rich in the foods that can activate your body's natural defense system. It is important to remember, though, that each of us is unique in our biological, environmental, and cultural makeup. The foods that work well for one person may not work equally well for another. So feel free to experiment and, again, to use your body-sense to select the diet that is best for you.

Perhaps most important is an attitude that values health above all else. For those who have experienced disease, there is no greater truth than "health is wealth." With this positive attitude, we can choose a healthy lifestyle—a lifestyle that enables us to steer clear of the toxins that are avoidable, and to assist our bodies in eliminating those that can't be avoided. It is a lifestyle in which fashion adorns bodies instead of disabling them.

OUR HAPPY ENDING

This postive attitude toward health is what sustained Soma and me as she modified her lifestyle to rid herself of the lump in her breast. Removing her bra was the first step. Initially, the feeling of her breasts without a bra was strange, although it was not uncomfortable from a physical standpoint. But after a week of wearing no bra, her breasts felt better than ever before. If there was any discomfort, it occurred when we were in public. At such times, Soma felt that the appearance she had to maintain demanded a bra. But soon even this discomfort evaporated, particularly as we increasingly viewed bras as health hazards. Eventually, Soma stopped caring about what others might think of her natural bustline. Fortunately, the only man whose opinion she cares about now is mine—and I have come to see artificially supported breasts as both unnatural and unhealthy, making them aesthetically unappealing.

After a few weeks, Soma's breasts seemed more connected to her body. She described the feeling of removing her bra as similar to that of removing a belt after eating a large meal. At such a time, the tightness and tension is relieved, and you experience a greater flow of energy and a greater ease of movement. About a month after removing her bra, Soma had the "need" to wear one for a social occasion. She tried on a bra that she had previously worn without any apparent discomfort. Now it felt like a constricting harness. So she decided to dress without a bra, but to deemphasize her breasts.

When we became aware of the effect of massage on lymphatic drainage, Soma began to massage her breasts on a daily basis. Though it isn't clear if massage is advisable in the case of a malignant tumor, we were not sure if the lump was malignant. Just as important, Soma's body-sense told her that the massage was having a healing effect. She

combined the massage with regular exercise, such as bicycle riding, and with an organic vegetarian diet. She further avoided toxins by drinking purified water and living in the mountains. Vitamin supplements, garlic, and herbal supplements completed her lifestyle approach to health.

Within two months after beginning these practices, Soma's lump disappeared. While we cannot be certain that she had cancer, we do know that her lifestyle approach returned her breasts to health. Healthy breasts don't have lumps—cancerous or benign. Our joy was matched only by our relief. Not only had healthy lifestyle practices saved her breast from disease, but they had also resulted in a wonderful pregnancy that ultimately produced our son, Solomon.

When Solomon is old enough to read this book, we will give him the advice that may have saved his mother from the agony of breast cancer—or worse. "Remember," we will tell him, "a healthy lifestyle is one in which body-sense is common sense."

9

The Real Enemy

When I was twelve years old, I met a new friend whose father had a subscription to *Playboy*. The boy led me to his closet to see the boxes of magazines piled high. I gulped and blushed. I felt that I was about to do something wrong. But curiosity led me forward through my anxiety. The boy opened wide one of the centerfolds. My eyes opened wide in amazement. "So that's what they look like," I thought to myself. We both spent the next hour or so looking through his stack of magazines and assessing which women were the "best."

I was bottle-fed as a baby. I had never known the contentment of nursing. To me, as for many men in America, breasts were nothing more than sex objects. I thought of bras as sexy, especially since they were worn by sexually provocative models in magazines and movies. I never thought that breasts were for anything other than appearance—and the pleasure of men.

Women are ultimately responsible for their personal attitudes and behaviors toward their breasts, but it would not be fair to place the blame on the victim. Women are indoctrinated by the culture in which they live—and American culture sees breasts primarily as subjects of fashion or objects for display, rather than a source of love and nourishment for a baby.

One and a half years after our frightening discovery of Soma's breast lump, my view of breasts had dramatically changed. We lay in bed together, contemplating our discovery of a cultural trigger for breast cancer. Our son, Solomon, who was almost a year old, lay between us, nursing contentedly at his mother's breast. He would have been purring if humans could. His eyes rolled up as he tasted the sweet milk. His little hands kneaded Soma's soft, warm breast. The scene was as beautiful as one can imagine.

"Now I know what breasts are for," I thought to myself.

The Bra and Breast Cancer Study taught us some very important lessons. In the fight against breast cancer, one of our major enemies is the way we see and treat women, and the way we condition women to see and treat themselves. Contrary to our cultural viewpoint, a woman is not a collection of objects— breasts, hips, legs, face, and hair. She is a whole human being.

"Losing my breasts to cancer set me free," one woman told us. "I'm not an object for men any longer. I'm just a woman with scars."

When a woman learns to treat her breasts as objects that enhance appearance, they belong not to the woman, but to her viewers. Thus, a woman becomes alienated from her own body. This doesn't mean that we should no longer view breasts as being beautiful. But we should realize that this viewpoint is a reflection of society's distorted perspective. By setting up a cultural fixation with the appearance of breasts, society has created a potentially self-destructive standard by which a woman establishes her self-identity and self-esteem.

The problem of alienation is not limited to women. We are all living in a time of alienation. We are alienated from our bodies, our lifestyles, our environment, our culture. Cancer is a disease of alienation. Some cells of the body become alienated from their neighbors and grow selfishly

out of balance, to the detriment of the whole. Urbanization is spreading like a cancer across the globe, leaving cement where once there was field, smog where once there was freshness, polluted water where once there was pristine spring, and engine noise where once there was bird song. Crime, the alienation of neighbor from neighbor, is spreading like a cancer across the United States. And we, the people, stand and watch helplessly as the times change. We are the cells of our society. As the parts of the whole of our culture, the signs of a sick culture will be felt within us all. Cancer is one symptom.

It doesn't take billions of dollars of research to realize that the human body was not constructed for the artificial world we have come to inhabit. How can our bodies know how to detoxify themselves when we subject them to such unnatural toxins? Can our bodies operate naturally and healthfully when stressed to meet the pressures of modern life? What is our culture doing to our biology and environment?

The writing is on the wall. We must all take the responsibility to read it for ourselves. Unfortunately, most people rely on some expert to read the writing for them. Who is the best expert on your life and the world you see?

We tried to notify experts about our findings. We wrote to Dr. Sam Broder, director of the National Cancer Institute, and presented him with our results. We sent the same information to Kerrie Wilson, national vice-president of the American Cancer Society; Dr. Maureen Wilson of the President's Cancer Panel; Eileen McGrath, executive director of the American Women's Medical Association; Pat Ireland, president of the National Organization for Women; Betty Dooley, executive director of the Women's Research and Education Institute; Beverly Baker, executive director of the National Women's Health Network; Amy Pryluck, executive director of the National Women's

Health Resource Center; and Dr. Samuel Epstein, professor at the University of Illinois School of Public Health.

None responded. Not even the women's groups. None.

Whom can you trust when your culture is the biggest enemy of your health? Can you trust your culture's leading authorities? Can you trust your culture's government? Can you trust your culture's private industry?

Earlier in the book, we mentioned the devastation that childbed fever brought to the lives of eighteenth- and nineteenth-century women. Thousands of mothers and their babies died in hospitals as a result of contamination carried by physicians who did not wash their hands between patients. Ignorance of the need for cleanliness was the cultural cause of that disease, and physicians and researchers of the day shared that ignorance. All experts are products of their time no less than anyone else.

However, this plague that killed women and their newborn babies did not end with the discovery of the cause. The medical establishment attacked Ignaz Philipp Semmelweis, the man who recognized the cause of childbed fever, and who was himself a respected physician. For thirty years, the medical establishment resisted the information, calling it preposterous and an insult to their character as healers. "Wash our hands, indeed! How could disease be spread by the hands? How absurd!"

It will be interesting to see how the medical establishment of our time deals with the questions we have raised about bras. Let us hope it doesn't take them another thirty years to catch on.

And let us hope that women regain some control over their lives, their bodies, and their health.

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Dressed To Kill

The Link Between Breast Cancer and Bras

Can the wearing of bras actually cause breast cancer? At first, this question may appear to be laughable, absurd. How can an article of clothing as seemingly innocuous as a bra have any relationship to disease? But as the pieces kept falling into place for Sydney Ross Singer and his assistant Soma Grismaijer, the correlation was just too great to ignore. Trained as a medical anthropologist, Singer had learned to disregard his own cultural biases when looking for answers. *Dressed to Kill* is the remarkable story of how Singer and Grismaijer came upon their important discovery, and of the ground-breaking study that established a scientifically valid link between breast cancer and bras.

For decades, the scientific community has acknowledged the existence of culturogenic diseases—that is, diseases directly attributed to lifestyle-related factors. Such culturally influenced acts as smoking cigarettes and eating fat-laden foods can lead to serious illness. Scientists have also documented numerous health problems associated with poorly designed clothing—from the cinched-waist corsets of the nineteenth century to the high-heeled shoes of today. Until now, however, bras have, for the most part, been excluded from such scientific scrutiny. Having reached cultural-icon status, bras are rarely viewed as anything less than a feminine necessity, an object of womanhood, and an anchor of fashion.

For the authors, however, a look at the constrictive nature of the brassiere gave rise to a theory. By suppressing the lymphatic system—an internal network of vessels that flush wastes from the body—could a bra cause toxins to accumulate in the tissues of the breasts, creating an environment ripe for a variety of health problems? In *Dressed to Kill*, the authors present in clear, straightforward language the scientific evidence that lays the foundation for their theory—a theory that pulls together many seemingly unrelated risk factors.

To test their theory, the authors created the Bra and Breast Cancer (BBC) Study. This ingenious study was designed to examine the history, attitudes, and behaviors of women with and without breast cancer in five major cities across the United States. From 1991 to 1993, the authors interviewed over 4,700 women. The results of this study, which are detailed in this book, were more telling than the authors had ever anticipated.

Breast cancer is the second leading cause of cancer-related death among women. In 1993, 46,000 women died of breast cancer, while approximately 182,000 additional women were diagnosed with this disease. It is estimated that one woman in eight will develop breast cancer. If you still think the connection between bras and breast cancer is funny, perhaps it's time to examine your own cultural prejudices. *Dressed to Kill* is an important and timely book that may be the light at the end of the tunnel for millions of women who are concerned about this terrible disease.

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